



Faculty of Economics and Business

**Trade Liberalization and Child Labor in Selected SAARC and ASEAN  
Countries**

Bilal Tariq

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# Trade Liberalization and Child Labor in Selected SAARC and ASEAN Countries

Bilal Tariq

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## **DECLARATION**

Name: Bilal Tariq

Matric Number: 14-0100-58

I hereby declare that this research is the result of my own investigation, except where otherwise stated. Other sources are acknowledged by giving explicit references and a bibliography is appended. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

Signature      -----

Date            -----

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## **ABSTRACT**

Child labor is a stubborn problem for South Asian Association for Regional Cooperation (SAARC) and Association of South East Asian Nations (ASEAN), which seems to be declining. In recent years, the trade openness has raised the response towards the problem of child labor in these adjacent regions, because of an additional influx of trade of differentiated products. Trade of differentiated products is a significant source of trade between developing countries and needed to be examined with regard to child labor. Existing studies tended to investigate the nexus between the trade and child labor in traditional trade theory setting and the results show mixed evidence across countries. Hence, it would be interesting for this research to embark upon the issue of new trade theory by demonstrating the trade effects of differentiated products on the child labor. Apart from that, it would be appealing to investigate the impact of free trade on the child labor in the major SAARC countries, namely, Bangladesh, India, Pakistan, Nepal, and Sri Lanka and selected ASEAN countries, namely, Cambodia, Indonesia, Philippine, and Thailand, which are known to have a relatively high number of child labor. Empirically, this research assesses the theoretical treatment of child labor and trade related effects by employing selection, scale and technique variables. The panel data method is employed to justify the spatial and temporal dimensions of the research. The estimation procedure of this dissertation consists of three main steps. In the first step, an exposure assessment of the simple model by capturing selection, scale and technique effects obtained for the child labor in closed economy case. In the second step, a variable of trade combined with selection, scale and technique effects variables to find the effect of a change in trade on child labor. Subsequently, the third step presents trade

interactions to check the trade-induced effects across the selected SAARC and ASEAN countries. The findings in this research confirm the importance of selection, scale and technique effects in the estimation of the full impact of international trade on child labor. Finally, this research proposes that the trade induced child labor effects can be worthwhile to address the underlying economies that gives a rise to offend child labor practices. The findings of this study recommends better policies to overcome the problem of child labor in the context of open economy and closed economy.

**Keywords:** Trade liberalization, Child labor, Differentiated products

# ***Liberalisasi Perdagangan dan Buruh Kanak-kanak di Negara-negara SAARC dan ASEAN Terpilih***

## ***ABSTRAK***

*Buruh kanak-kanak ialah masalah yang sukar ditangani oleh Pertubuhan Kerjasama Serantau Asia Selatan (SAARC) dan pertubuhan Negara-negara Asia Tenggara (ASEAN), dengan kadar yang semakin menurun. Sejak kebelakangan ini, perdagangan bebas telah menimbulkan masalah buruh kanak-kanak di antara kawasan-kawasan yang berdekatan ekoran daripada peningkatan aktiviti perdagangan bagi produk-produk yang berbeza. Perdagangan produk yang berbeza adalah sumber penting dalam perdagangan antara negara-negara membangun; maka usaha pemeriksaan teliti terhadap penggunaan buruh kanak-kanak perlu dilakukan. Kajian terdahulu mengkaji hubungan antara buruh kanak-kanak dan perdagangan berdasarkan teori perdagangan tradisional telah menunjukkan hasil kajian yang bercampuran buruh kanak-kanak. Oleh itu, kajian ini menyiasat isu yang berkait rapat dengan teori perdagangan baru, dengan menunjukkan kesan perdagangan produk-produk berbeza terhadap buruh kanak-kanak. Selain itu, kajian ini juga akan memberikan maklumat yang penting berkaitan dengan kesan perdagangan bebas terhadap buruh kanak-kanak di negara-negara SAARC utama iaitu, Bangladesh, India, Pakistan, Nepal dan Sri Lanka dan negara-negara ASEAN yang terpilih iaitu, Kemboja, Indonesia, Filipina dan Thailand, yang terkenal dengan mempunyai bilangan buruh kanak-kanak yang tinggi. Secara empirikal, kajian ini menyiasat*



*buruh kanak-kanak dan kesan teori perdagangan baru dengan mengambilkira kesan pembolehubah berkaitan pemilihan buruh, skala dan teknik. Kaedah data panel telah diguna untuk menjustifikasikan dimensi ruang dan masa kajian. Prosedur kajian ini terdiri daripada tiga langkah utama. Pada langkah pertama, hubungan kesan pemilihan, skala dan teknik oleh buruh kanak-kanak dalam model ekonomi tertutup. Pada langkah kedua, pembolehubah perdagangan digabungkan dengan kesan pilihan, skala dan teknik untuk mencari kesan perubahan dalam perdagangan buruh kanak-kanak. Selepas itu, langkah ketiga membentangkan interaksi perdagangan bagi memeriksa kesan perdagangan yang sedang berlaku di seluruh negara SAARC dan ASEAN yang terpilih. Hasil kajian ini membuktikan kepentingan kesan pemilihan, skala dan teknik dalam pengkajian kesan perdagangan antarabangsa terhadap buruh kanak-kanak. Implikasi ini kajian ini menyarankan polisi yang lebih baik bagi menangani masalah buruh kanak-kanak dalam konteks ekonomi terbuka dan ekonomi tertutup.*

**Kata kunci:** *Liberalisasi perdagangan, Buruh kanak-kanak, Produk-produk berbeza*

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## **LIST OF ABBREVIATIONS / ACRONYMS**

ASEAN	Association of South East Asian Nations
SAARC	South Asian Association for Regional Cooperation
IPEC	International Program on the Elimination of Child Labor
ILO	International Labor Organization
UNICEF	United Nations Children's Fund
UNCRC	United Nations Convention on the Rights of the Child
UCW	Understanding Children's Work
FDI	Foreign Direct Investment
C 138	ILO Convention No 138 (Minimum Age Convention)
C 182	ILO Convention No 182 (Worst Forms of Child Labor)
C 29	ILO Convention No 29 (Forced Labor)
C 105	ILO Convention No 105 (Abolition of Forced Labor)
UN ESCAP	The United Nations Economic and Social Commission for Asia and the Pacific
UN	The United Nations
LDCs	Less Developed Nations
GDP	Gross Domestic Product

# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 Chapter Overview**

The chapter introduces the thesis. It provides the background of the study followed by the problem statement, general and specific study objectives. Further, it discusses the significance and scope of the study. Finally, it describes the outline of this thesis.

### **1.2 Introduction**

The child labor is the use of children in industry or business that harms or keeps them away from school ( ILO, 2015). A robustness check on trade and child labor literature shows that demand for child labor is associated with demand for trading goods. One possible reason for the link between trade and child labor apparent in Romer and Frankel (1999) study shows that there is a strong association between trade and income as documented by Edmonds and Pavcnik (2005). The growing literature on the modern aspects of international trade sheds the new light on the effects of trade of differentiated products, its market size and the international division of labor. Whereas, the issue of child labor along with the trade of differentiated products is noteworthy and need to be debated in the age of new trade and globalization. The emergence of monopolistic competitive firms in developing countries has created the demand

for educated and skilled workers in sufficient numbers to make it possible to create integrated production systems spanning more than one country. Economies that are taking part in international trade are expanding their potential beyond domestic borders to reach a global market. Trade liberalization is now becoming an important aspect of globalization, economic development and sustainability; nevertheless, the countries with accelerated growth in the labor intensive sector are viewed as contributing to the child labor violations (Chan, 2003).

The theoretical work on labor and trade is relatively rich as compare to child labor and trade (Estevez, 2010). The discussions on trade impacts on labor are segregated into different categories i.e., the effects of income deviations, effects of variation in the relative returns to labor suitability, interaction effects of factor endowments, and effects of labor policy. Generally, it is viewed that higher level of trade is associated with greater levels of income, and these are not necessarily homogeneously distributed, comfort from trade do not accrue to the rich alone (Collier and Dollar, 2002).

In the light of previous studies, this study discovers that research on child labor is rooted in one side of the story, namely the household's decision, which is related to the supply side of child labor, specifically based on income level of families. There are only a few studies such as Edmonds and Pavcnik (2005), Dinopolous and Zho (2007), Kis-Katos (2007) and Estevez (2011 and 2014) which examine the issue of child labor from the demand side. The mentioned studies assumed that children are employed in those sectors which are producing homogeneous

goods and trade of homogeneous products affects the demand of child labor in exporting countries.

While, this study is focusing on production and trade of differentiated products by utilizing selection effect, this effect demonstrates that how changes in a number of firms parameter affect the relative demand of child workers. Particularly, trade induced child labor selection effect will determine whether trade liberalization is a remedy or exacerbate for child workers. Akram and Mahmood (2012) argue that trade of differentiated products is not as prevalent in developing countries as in developed countries, yet it is an important source of trade between the countries. Edmonds and Pavcnik (2005) confirm that such type of trade indirectly affects the child labor through overall market impacts and it can be observed with regard to child labor. Firms that are engaged in trade of differentiated products in developing countries usually related to those industries where the presence of child labor cannot be rebutted.

In the light of traditional interpretation of trade and child labor literature, Estevez and Levy (2014) find out that impacts of trade on the demand of child labor vary across sectors and the demand of child labor is a function of child worker productivity. Previously, Kurokawa (2011) examines that highly skilled workers are complement with low skilled workers in production of symmetric intermediate varieties. The findings of this study validate that the trade has an impact on the demand of both skilled and unskilled labor, the same is true in case of trade and child labor (Estevez and Levy, 2014). The trade literature postulates that the trade and

child labor are interconnected and the increase in the demand of labor can affect the demand of child workers (Edmonds and Pavcnik, 2005).

Estevez (2010) finds out that firms usually use both unskilled and skilled labor in the production of differentiated goods. The complimentary effect increases the skill premium and changes the demand of unskilled labor directly and indirectly affects the demand of child labor. In a similar style, Estevez and Levy (2014) examine the effect of low and high skilled workers' wages, and choices made by firms to upgrade their techniques of production. Since, the advancement in the technique of production is biased toward skilled workers, and less chances of unskilled labor or child labor in the production of differentiated goods.

### **1.3 Research Background**

The issue of child labor has caught a great attention in the modern economics throughout the history of the world due to globalization (Hafner-Burton, 2013). The 19<sup>th</sup> and 20<sup>th</sup> century period, see the worst scenarios on screen; the industrialized nations, especially the Western countries have experienced the worst form of child labor. The child labor issue is worthwhile to investigate the existing studies and at what level counterweight to entrench the child labor with the help of economic tools. As a result of sincere and continuing efforts, the world has now recognized the importance of human capital, innovation and knowledge to counter the child labor. The world increasingly realizes that child labor is a blot for the

economy and it has adverse effects on the sustainable development (Swinerton and Rogers, 1999).

Trade embargoes such as trade sanctions, outright bans and boycotts are popular remedies for child labor reduction. However, such instrument may have some unintended consequences for the poor countries. The ramification of traditional scholarly perception is that these sensations make the poor countries more unproductive, the only cure of child labor is prosperity via economic tools i.e. trade liberalization (Jafarey and Lahiri, 2002). Bhagwati (2001) states that the complex problems of an economy cannot be solved by sanctions; global issues such as child labor can only be solved by globalization. A trade sanction is a tool of anti-globalization; as a matter of fact, anti-globalization sentiments are most prevalent in the rich countries and poor countries are affected by global elites policies. The sentiments are directly destroying the industries of poor countries (Wood, 1995) and making the poor countries a destitute place (Hameed and Nazir, 2009). As a result, the poor countries become an unsafe place for children (Emerson and Souza, 2011).

The determinants of child labor are strongly related to macroeconomic variables such as performance of an economy, structural changes, behavior variations, and decision-making of economies. The demand and the supply side of the economy, both independently affect the child labor at the macro level. Poverty and inappropriate education system explain the child labor supply side, while the existence of a low paying informal economy is amongst the one of the major causes of the demand side of child labor. The other macroeconomic factors of an

economy which determine the demand for child labor are the size of the informal economy, inflexible labor markets, instability of the firm's structure, the failure of industries to scale up the production and lack capacity to adopt the modern manufacturing technologies (Basu et al., 2010; Edmonds, 2010; Basu and Zarghamee, 2009; Edmonds and Schady, 2009).

Traditional economist usually sees this issue solely through the lens of labor demand. The great Smith (1776) talks about the value of children in labor shortage societies, later Engels (1892) emphasizes on the working conditions of children during the initial stage of the industrial revolution. Marx (1867) also has a very serious concern about children, because the replacement of machines with muscular power is now allowing child labor formally. Marx points out that labor supply is not transparent, capitalist and parents are major exploiters because in 18<sup>th</sup> century families are unable to meet their basic needs (Edmonds, 2007).

Even in the current century, the situation of child labor is a global reality bites, especially in the developing countries. Children are treated as an adult labor, they engage in dangerous work and often has to work very long time in hazardous activities for a very low pay, their earnings are only 10 to 20 percent of adult male labor wages (Abebe and Bessell, 2011 and Webbink et al., 2012). Edmond and Pavcnik (2005), Kis-Katos (2007) and Estevez (2011) have examined the child labor by using global factors such as trade liberalization that affects the demand of child labor. These studies assume that child labor is common in those sectors which produce homogeneous goods for trade. In the latter study, Estevez and Levy (2014) examine the

child labor in intra industry trade setting, they assume that children are nearly as productive as their adult counter partners and wage of child labor reflect the productivity of child workers.

Labor force can be categorized into skilled and unskilled labor (Bharadwaj, 2014), male and female labor, adult and child labor (Azmat and Petrongolo, 2014). Adult labor and child labor are close substitutes (Basu and Van, 1998) and child labor are economical and can be employed in any field of work at cheapest price as compared to adult labor (Hindman, 2011), but this justification for hiring the child labor is not tolerable in civilized and developed countries because child labor is deprived of happiness and enjoyment of childhood life (Nieboer, 2011). An historical overview of these western nations tells us that the developed nations were also victimized the children at the initial stage of development. This holds true in sample of developing countries of Far-East Asia which have low child labor incidences (Lin, 2011).

A global picture of child labor shows that out of total child workers 45% are in Asia, 40% are in Africa and only 6% in Latin America (ILO, 2012 and UNICEF, 2014). This figure imply that the child labor is still a colossal problem in Asia and Africa. In this context, the number of economically active children is highly concentrated in the poorest nations of Africa and Asia. The most serious concern is that many of these working children have to work in unsafe and sometime hazardous environment (UNICEF, 2014).



#### **1.4 Definitions of Child Labor**

Child labor is defined as all economic activities that involve the children under the age of 12 years (Islam and Choe, 2013). It also refers to a weekly economic exercise lasting enough to affect the education and health of those aged 12-14 (Dorji and Gyeltshen, 2013). In other words, it is defined as all hazardous work which could affect the health of children under the age of 18 (Aktar and Abdullah, 2013).

UNICEF (2008) interprets the child labor as work that violates a minimum number of hours, depending on the age of an adolescent and on the type of work, such work is considered dangerous to the child and should therefore be eradicated. Ages 5-11, at least one hour of commercial activity or 28 hours of family work per week. Ages 12-14, at least 14 hours of commercial activity or 28 hours of family work per week. Ages 15-17, at least 43 hours of domestic or economic work per week (Johnson and Bahemuka, 2013).

Ventevogel et al. (2013) define that child labor on the patterns of children's activities. Such as expressed it on the basis of the adverse impact of work on children's mental, physical, moral and social development as well as deprivation of educational opportunities. Different countries enacted and introduced various legislations, for combating the child labor, which depend upon the socioeconomic constraints of these countries. These legislations have proposed for defining child labor to find a solution to the problem. These definitions provide the base to make a law on child labor in SAARC region. On the basis of child labor definitions

South Asian countries are applying minimum age acts according to their economic, political and social structures.

According to the international definition of employment, the child labor can be identified as economically active children if they work for at least one hour in a reference week<sup>1</sup>. Thus, child labor in this research is a substantial as promulgated by the ILO and world development indicators, which is based on the agency's Minimum Age Convention No 138 (1973). Child labor is surprisingly difficult to define, this research establishes a normal definition and considered children under the age of 14, engage in economic activity.

### **1.5 Child Labor in SAARC and ASEAN**

Figure 1 shows that child labor relatively looks small but if we compare in absolute term, it is intolerable in the South and South East Asian region, the population between 5-14 year old is under serious threats of hazardous work in industry and local family businesses. The countries like Nepal and Cambodia are facing a worse child labor situation due to limited trade facilities (Luong, 2011). India has relatively less child labor percentage, but the total volume of child labor victims is at an alarming level because of a huge population share in the SAARC region.

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<sup>1</sup> The calendar week containing the 12<sup>th</sup> day of the month, which is used as the time period for documenting the employment and labor force status of respondents.

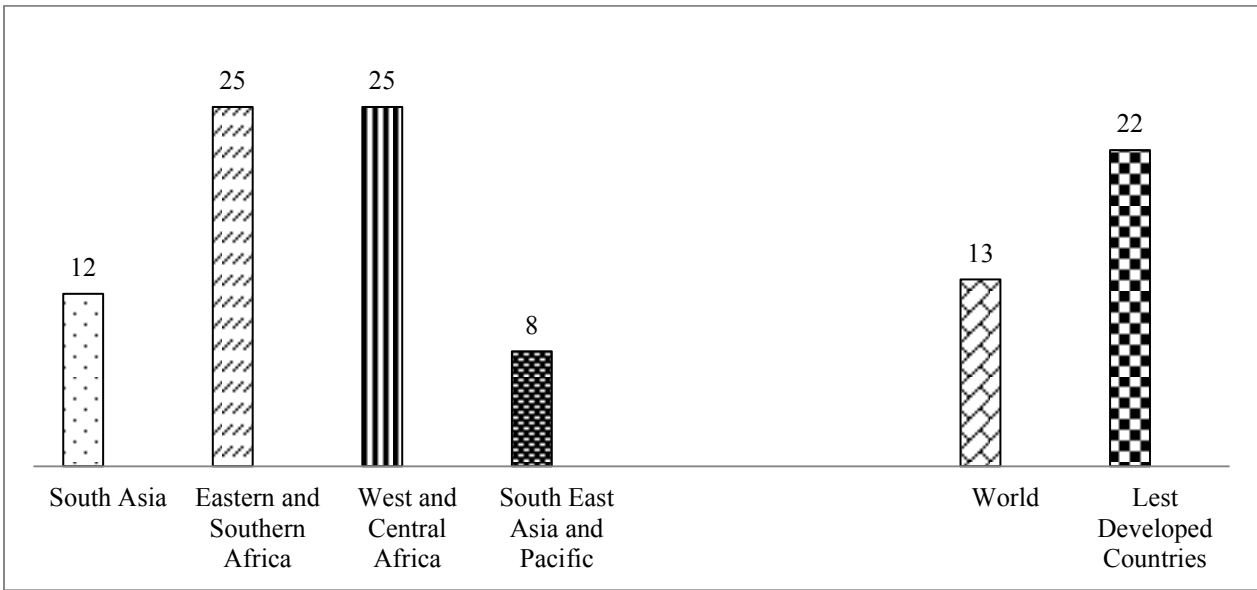


Figure 1: Percentage of Children Aged 5 to 14 Years Engaged in Child Labor

Source: UNICEF Global Databases (2014)

India, Bangladesh and the Philippines are the leading countries in the Asia, which has a large number of children who are engaged in different kinds of production (Rahman and Khanam, 2012). In Bangladesh, there are more than 14 kinds of goods made by children, many of them are of an industrial nature, such as footwear, leather and textile including jute (Hindman, 2011). In the Philippines, most children are pushed into the labor force, and forcefully bounded to work on the family farm, but the most miserable, facts are to be, they found in mining pyrotechnics and pornography activities (Aldaba et al., 2003). India is the largest single producer of the juvenile workforce in the world due to the large population and significant poverty (Phillips et al., 2014).

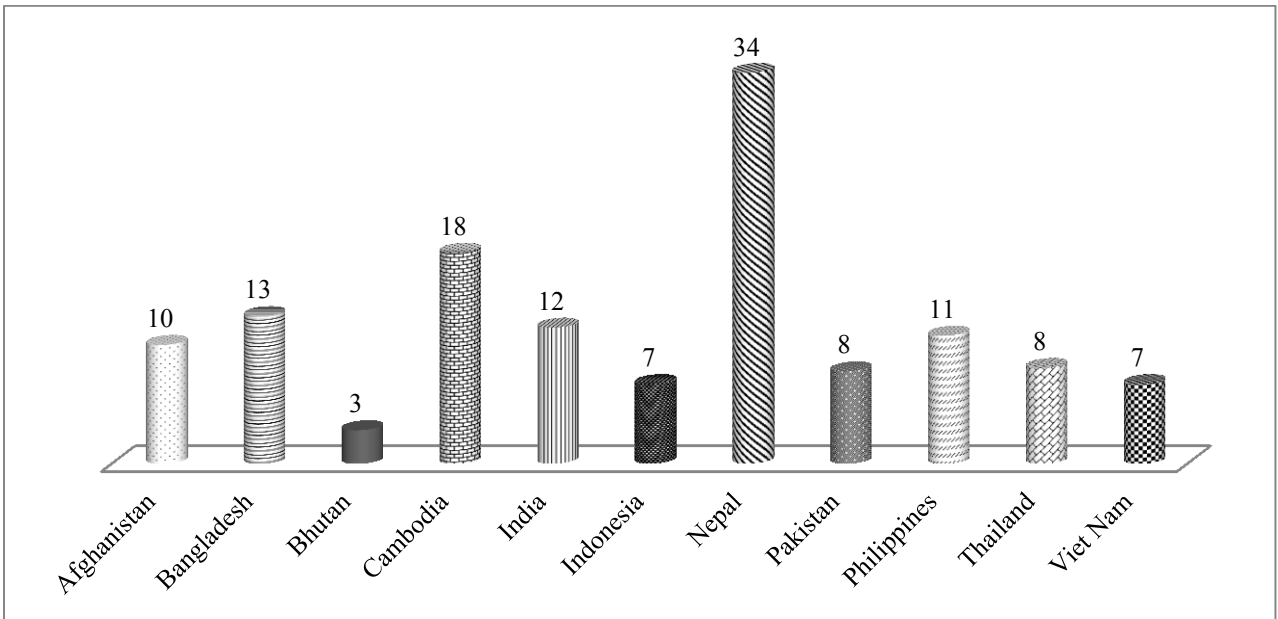


Figure 2: Percentage of Child Labor in SAARC and ASEAN

Source: UNICEF Global Databases (2014)

Figure 2 shows the phenomenon of child labor in SAARC<sup>2</sup> and ASEAN countries. The situation of child labor in Nepal is worst among all the countries of the region due to the intriguing relationship between adult minimum wage and child labor which is associated with conventional trade practices. Whereas, Cambodia is the worst country in South-East Asia due to limited trade facilities and war situations. In Bangladesh 13% children have to work in the labor market and most of the children are under age 15, while in Pakistan and Thailand 8 % children are engaged in child labor. Moreover, in India 12% children are engaged in child labor, but in absolute term the situation in India is the worst in the SAARC and ASEAN region.

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<sup>2</sup> It is worth noting, that South Asia has 21.6 million children who are working, out of 246 million children between 5-14 years (ILO-IPEC, 2013).

The main cause of child labor in Indonesia, Philippines and Cambodia usually associated with the poverty and illiteracy level of their families especially their parents. Other exploratory factors of child labor are economic and social circumstances, high rates of unemployment, lack of awareness and lack of access to quality education (Kampan and Tanielian, 2014). Generally, child labor is condoned by the community (UNICEF, 2011) in numerous cases, adolescent<sup>3</sup> expects to work as adults, especially in the agronomic setting (Hall et al., 2011).

## **1.6 Trade and Child Labor**

During the period of 1990 to 2010, the world observes the dramatic changes in the technologies, labor markets and the structure of trade due to trade advancement in the world (Meschi et al., 2011). The West is adopting more efficient and capital intensive green technologies and shifting its older and less labor intensive technologies to developing countries (Kucera and Roncolato, 2011). These structural changes are now becoming the source of change in the mode of trade (Kumar, 2013), now the developing regions like SAARC and ASEAN are moving towards the trade of differentiated products instead of trade of homogeneous goods (Akram and Mahmood, 2012). This transformation is changing the form of child labor in developing regions. Firms that are engaged in the production of differentiating goods may benefit from technology in which unskilled humans are not highly valued, whereas

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<sup>3</sup> Adolescent, are considered as adults too early, in life often carrying out physical labor equivalent to adults (Lieten, 2011).

other firms would benefit from more skilled and trained workforce (Baland and Robinson, 2000).

The opponents of trade liberalization advocate that growing labor demand due to market integration, increases the earning opportunities of children and surely leads to more child labor. Some human right specialists recommend the practice of trade sanctions tools, especially on the exports of those countries which have high levels of child labor, as a means to eliminate the child labor (Kis-Katos and Sparrow, 2011).

Banerjee and Nag (2013) argue that child labor reduction can be achieved by trade liberalization and this reduction positively affects the labor productivity in a more than offsetting fashion. Past studies had focused on the child labor issue such as their education and poverty levels. However, studies on the nexus between child labor and trade appears to be limited (Kis-Katos and Sparrow, 2011). During the twentieth century child labor focus on the conditions of child workers (Hindman, 2011), however, during the 21<sup>st</sup> century, existing studies shift their focus to the determinants, demand and supply side of the child labor (Blau, 2012).

For instance, earlier studies centered mostly on the social cost of child labor (Nardinelli, 1980), the widespread existence of this issue have now fallen into the economic benefit of ending child labor (Glut, 1995). Figure 3 shows that the global benefits of ending child labor can be 4300 billion US dollars in one fiscal year, the South Asia only region which can attain maximum benefit from ending the child labor by trade liberalization.

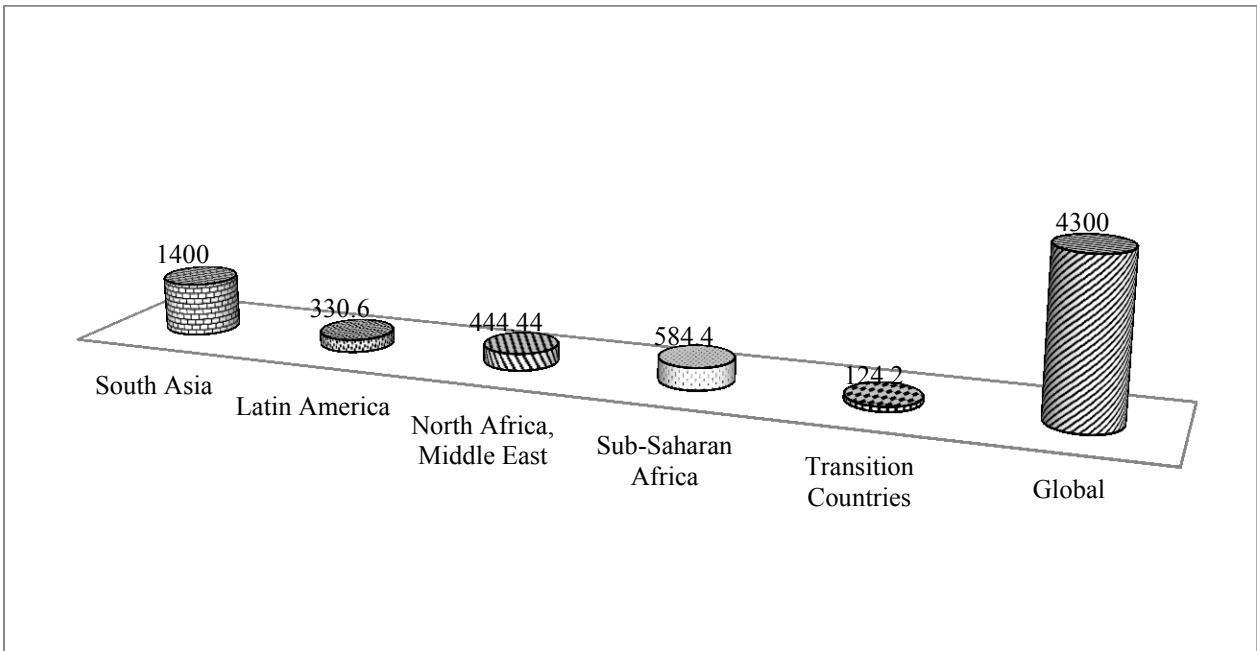


Figure 3: Economic Benefits of Ending Child Labor via Trade Liberalization (In Billion US\$)

Source: International Labor Organization (2002)

Firms in transition economies, Malaysia and Singapore, entered the market economy with a bundle of resources and classified partially industrialized, these countries have relatively less child labor as compared to other countries that's why the economic benefits looks small, but these countries have already enjoyed the economic benefits of ending the child labor in the last two decades (Kenayathulla, 2012). On the other hand, some countries of the ASEAN region like Cambodia, Indonesia, Philippine, and Thailand are still facing child labor and trying to draw a line between acceptable and unacceptable child labor (Kampan and Tanielian, 2014).

The political environment of reducing or eliminating child labor in the last decade of current century got the tremendous momentum due to awareness (Hindman, 2011) and trade

liberalization at global level (Edmonds and Pavcnik, 2005). If the child labor situation is examined at the beginning of the 21<sup>st</sup> century, it was worse (ILO–IPEC, 2013), but the continuous struggles of non government organizations (NGOs), global collaboration and modernization compel the working children to come out the economic activity (Mohapatra and Dash, (2011).

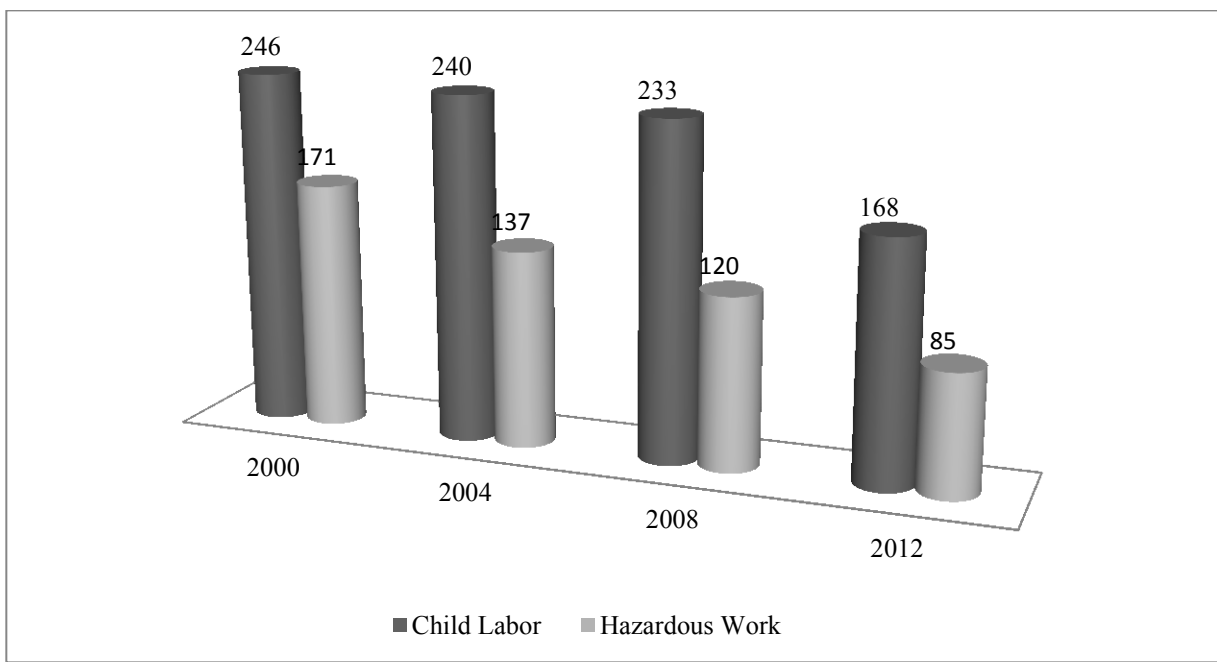


Figure 4: Worldwide Child Labor

Source: ILO–IPEC (2013)

Figure 4 shows that, at the beginning of the 21<sup>st</sup> century, at global level, the conditions of factory work were needlessly unhealthy and oppressive for working children that were 246 million in 2000, but in 2012 this trend decline to 168 million, this is a great achievement in the child labor reduction activities. Similarly the working children in hazardous activities also



decline from 171 to 85 million (ILO-IPEC, 2013). It is interesting to note that the work on elimination of child labor is in the right direction, but the target of international child labor organizations is to eliminate the worst form of child labor<sup>4</sup> at the end of 2016, it seems difficult but achievements are hopeful (van de Glind, 2010).

The tendency of the decline in child labor is mainly because of trade liberalization. Fors (2012) illustrate that the trends in participation rates, for the children, as child labor 10-15 years between 2000 and 2012 are decreasing, from the year 2000 and on words the declining trend of child labor in the world seems to slow down surprisingly. In these years public officials and the media have shown a great sympathy in child labor, along with social awareness, the effect of economic growth on child labor starts to be left distinctly by increasing trade trends in developing countries.

## **1.7 New Trade Theory and Child Labor**

Krugman's (1979) framework of international trade states that the industrial sector having features of increasing returns to scale<sup>5</sup> and total number of firms in the industry shrinks although each one of the remaining firms produces more than before (Feenstra, 2003). Trade expands the consumption basket and enables the consumers to use both local and imported

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<sup>4</sup> Harmful to the child either psychologically or physically (Dessy and Pallage, 2005).

<sup>5</sup> Reduction in cost per unit resulting from increased production (Balassa, 2013).

varieties of goods. At the same time, when income level of a country increases due to trade openness; the country implements stricter child labor approach, which causes amplified child labor reduction activity (Edmonds and Pavcnik, 2005; Edmonds, 2015). The increasing returns to scale in Krugman's framework triggers the producer to hire more efficient and skilled labor to raise the production level. This framework has the potential to support the child labor elimination policies and discourage the child labor, because the producer wants to produce more and additional unit of adult labor is not expensive for him due to increasing returns to scale. In this framework, there is a selection on the production side and the consumption side. The producer selects best available labor in the production process for making differentiated products (Miles et al., 1978) and the consumer has an option to select a variety of differentiated products (Krugman and Venables, 1996).

Krugman's framework (1979) on international trade find out that, only more competent firms have a potential to upgrade their scale of production by using more skilled workers due to increasing returns to scale (Krugman, 1979). Estevez (2011) concludes that child labor is an inappropriate option for producers than unskilled adult labor even after accounting for productivity differences. Estevez and Levy (2014) assume that, in the production of differentiated product, child labor is not a better option and productivity differences make it an expensive option for the producers.

## **1.8 Problem Statement**

Child labor has become an issue that invokes passion because it brings together people concerned about the exploitation of children on moral and ethical grounds, some of child labor issues are managed at national level while others are internationally workable (Edmonds and Pavcnik, 2005). Trade liberalization is combating the problems that are connected with the child labor and converting local constraints into an aggregated global constraint (Emerson and Souza, 2011).

The effects of trade liberalization on child labor are universally debated and aroused great sympathy among reformers (Abebe and Bessell, 2011). From a theoretical point of view the effects are ambiguous (e.g., Basu et al. 2010) as trade liberalization works probably through various routes (such as Casson, 2012). There is a conventional view among economists that trade and child labor issues should be treated independently and separately (Basu and Zarghamee, 2009). Nevertheless, this approach need to be supported theoretically in the process of trade of differentiated product models as low wages generate child labor and upset the effects of trade liberalization on child labor, national welfare and income distribution (Doran, 2013).

It is widely recognized that international trade raises the economic welfare, but, if a production is labor intensive then international trade leads to some detrimental effects on child labor. The existing literature on trade and child labor provides mixed evidence due to the

structure of developing economies, sometimes it is beneficial in the short run and harmful in the long run or vice versa (Edmonds and Pavcnik, 2006).

The incidence of child labor in the presence of monopolistic competitive firms and trade of differentiated products between structurally identical countries is remained ambiguous in the existing literature (Estevez, 2010). Furthermore, the effects of production of differentiated goods are mostly ignored in a stream of studies about the impact of trade on child labor (Davies, 2005 and Cigno et al., 2002). The effect of strict regulation by using different types of penalties is still questioned in case of production of differentiated goods because these effects depends upon the firm's production process which relatively affects the productivity of child labor and adult labor (Estevez, 2011).

The trade literature suggests that if a country engaged in the trade of homogeneous goods, then unskilled labor force is demanded especially in the traditional agricultural sector. As a result, the demand for the child labor in the economy increases. On the contrary, another stream of studies deliberately deviates from the conventional trade theory to new trade theory and postulate that highly skilled and well-educated workers are required to produce differentiated goods. Therefore the trade of differentiated goods has resulted in a reduction of demand for child labor (Estevez and Levy, 2014).

The trade of differentiated goods is not free from child labor effects. They certainly enhance the child labor, the nature of trade induced child labor effects need to be analyzed in

the trading nations, and whose responsibility is to evaluate child labor effects of trade. These concerns are frequently discussed in trade and child labor literature (Diller and Levy, 1997). The majority of studies investigates the child labor effects of trade by using traditional trade theories and find mixed evidence of the research. Despite the substantial number of studies that have investigated the child labor effects of trade, to date, only a few studies which investigate the impact of new trade on child labor. A large body of research, primarily in the SAARC region, narrates that trade appears to be a source of reduction in child labor (Topalova, 2010 and Ray, 2000), but recent developments in new trade theory open the new era for research (Iqbal et al., 2012).

On this note of course, it has raised the concerns regarding the structures and processes generated by trade liberalization, which can affect the child labor in a monopolistic competitive environment. Furthermore, a paucity of research that investigates the effects of trade of differentiated products on child labor offers another motivation for this dissertation to embark upon the issue of child labor and trade. So, It will be interesting to investigate the impact of trade expansion and child labor, along with the nature of trade induced child labor effects.

In the recent years, the impact of globalization on the child labor has started to spark both public and academic debates. The role of multinationals in world trade and globalization is increasing and the concerns regarding the child labor and development policies in SAARC and ASEAN regions are also mushrooming. Under these circumstances, this dissertation tries to find out the impact of trade liberalization and stringency in child labor policy which can affect the

firm's labor amelioration<sup>6</sup> process, its scale of production, consumption of goods and the number of firms in the economy.

A review on a bulk of literature reveals that the current models of trade and child labor collectively does not address the following comprehension queries. The most prominent concern is the trade of differentiated products that can influence the child labor in the economy (Sapir, 1995). Estevez (2010) examines that there is scarcity in the trade and child labor literature regarding the trade liberalization that can affect the firm's labor amelioration process, its scale of production, technique of productions and the number of firms in the economy. This research is an attempt to fill this theoretical gap by reviewing the research literature and articulate an expansionist theory of new trade and child labor by using trade liberalization affects on the demand for child labor from domestic and foreign firms.

Several studies have attempted to correlate the trade and child labor in traditional trade theory, to the best of this study knowledge, there is a paucity of empirical studies that tries to systematically demonstrate the effects of trade on child labor under the new trade theory. Thus, this thesis is an attempt to sort out the effects of trade on the child labor in the South Asian Association for Regional Cooperation (SAARC) and the Association of Southeast Asian Nations (ASEAN) countries by applying the new trade theory. Now the question arises why

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<sup>6</sup> The act of making something better, in this study the allocation of resources from output towards hiring more skilled workers and terminate the less skilled workers (or child labor) engaged in the production process is used to express the act of amelioration.

SAARC and ASEAN? There are many reasons for taking these regions, but the most important reason is that the SAARC and ASEAN region are two pivotal regional platforms for economic cooperation in Asia. Multiple stress of accelerating population growth rates, rural to urban migrations and globalization is major contributing factors of child labor in SAARC and ASEAN regions and sensitivity of child rights issue making it an issue of priority demanding immediate attention.

### **1.9 Objective of the Study**

The general objective of this research is to propose a trade and child labor framework under the new trade theory. The purpose of this framework is to give a new idea of increasing returns to scale and monopolistic competitive environment which allows this research to depart from the traditional trade and child labor models that follow the constant returns to scale and perfect completion.

To achieve the general objectives, this research aims at addressing the following specific objectives:

1. To investigate the empirical relationship between the trade and child labor in the major SAARC and selected ASEAN countries.
2. To assess the incidence of child labor in the presence of production and trade of differentiated products in the selected countries.

3. To investigate the nexus between child labor and the trade induced scale, technique and selection effects for SAARC and ASEAN countries.

### **1.10 Significance of the Study**

As far as this research concerns, this is the first step to empirically address the child labor effects of trade of differentiated products and is the first to provide the evidence of the significance of controlling the child labor by selection effect. The important aspect of the foregoing analysis is that it focuses on the implication of child labor penalty in a theoretical framework and the impact of trade liberalization on child labor by using empirical analysis in the markets where increasing returns and monopolistic competition prevails, policy effect yield selection, technique and scale effects.

This thesis gives a direction to fill the gap in the literature by developing the new theoretical and empirical evidence of trade and child labor. Besides the empirical evidence of trade and child labor, this research shows the trade induced child labor effects in distinguishing products that can be disintegrated into a selection effect, a scale effect, and a technique effect. In addition, the upcoming theoretical and mathematical formulation developed in this thesis assumes that firms are taking part in withdrawing the child workers from the industry due to child labor penalty. This approach gives a new line for the researchers by incorporating the heavy child labor penalties in the model as a policy variable. On the other hand, this dissertation



explores the trade induced child labor selection, scale and technique effects by using empirical strategy.

It is hoped that the present thesis on trade and child labor will guide and stimulate the further work in the sphere of new trade theory. It will be a valuable addition to the trade literature to control the child labor by using market forces and economics tools. Not only this study will give the new direction to trade policymakers in promoting the trade in the SAARC and ASEAN regions, but also it will support the arguments of human rights activists who want to eliminate the child labor.

### **1.11 Organization of the Study**

This study is divided into six chapters. Chapter 1 focuses on the introduction of the study, covering statement of the problem, significance of this thesis and description of the study area objectives. Chapter 2 gives a general overview of child labor in SAARC and ASEAN countries. A comprehensive review of the literature relevant to the issue under consideration is given in Chapter 3. The data used and methodology developed in this dissertation are explained in Chapter 4. Chapter 5 presents the main findings of newest estimates and trends of child labor in SAARC and ASEAN countries. Finally, Chapter 6 presents the conclusions, limitations and recommendations of the research.

## **CHAPTER 2**

### **AN OVERVIEW OF SAARC AND ASEAN**

#### **2.1 Chapter Overview**

In this chapter, a brief overview of the Association of South East Asian Nations (ASEAN) and South Asian Association for Regional Cooperation (SAARC) economies is discussed. The child labor situation in selected ASEAN countries and major SAARC countries is also part of this chapter. Moreover, different definition of child labor and major global and selected regional development is also supplied in this chapter.

#### **2.2 Introduction**

Two important regional associations of Asia, ASEAN and SAARC, consist of more than seventeen different economies. These economies vary from each other in term of their political structure, degree of independence, size and performance and other socioeconomic indicators. However, some associations can be drawn among these regional economies. This section will briefly examine the overall economic structure, trade flows and patterns in the SAARC (South Asian Association for Regional Cooperation) and ASEAN (Association of South East Asian Nations) region.

## **2.3 Background of the ASEAN Countries**

South East Asia is a rapidly growing region as a tourist destination and global hub for economic cooperation (Van Soolingen et al., 1995). It is the integration of two heterogeneous segments; insular South Asia, a string of archipelagoes to the south and east of mainland and mainland South Asia, a continent projection (Emmerson, 1984). Extending more 1,100 kilometers southward from the mainland into Southeast Asia there came a Malay Peninsula; this is a geographic part of the mainland South Asia, and it shares many primitive and derived features with the surrounding islands along with ecological and cultural affinities (Dick and Rimmer, 1998) and thus works as an economic junction between the two regions (Terwiel, 2013).

### ***2.3.1 Overview of ASEAN Economies***

Association of South East Asian Nations is a set of heterogeneous associates with respect to their origin, liberalization, economic performance and system of governance. These countries were colonies of different powers, i.e. French, Spanish and British. These countries adopt their legal framework of French civil law and English common law with some amendments according to their socio-political and cultural suitability. The performance of these regional economies differs markedly in term of human capital, population growth, and employment in relation to each other.

After the World War II, European oppression on the South East Asia, Indian Subcontinent and the Middle East, now, was ungovernable. Especially after the Japanese occupation of the British, Dutch and French territories shattered the image of European preeminence during wartime. The destabilization of European rule led to the rapid growth of nationalist movements in Asia especially in Indonesia and Malaya. So, these rulers have to liberalize the occupied areas. In the aftermath of independence the nations of Southeast Asia establish the Association of South East Asian Nations in 1967.

Mainland South Asia is split into the countries of Cambodia, Laos, Myanmar, Thailand, and Vietnam; the small city state of Singapore located off the southern tip of the Malay Peninsula (Miettinen et al., 2011). Cambodia, Laos and Vietnam located at the eastern chunk of the mainland and collectively these countries are known as Indochinese Peninsula (Emmerson, 1984). Malaysia occupies the both mainland (Peninsular) and insular (Borneo) part of island Borneo island, along with the small sultanate of Brunei, the rest of insular South East Asia contains the archipelago nations of Indonesia and Philippines (Miettinen et al., 2011).

The confederation of Southeast Asia has a major impact on the dissemination of the region's economic development, and it formulates uneven patterns of population progression and economic expansion (Dufhues et al., 2011). It anathematizes a strong sense of class distinction and transpires a larger discrepancy between the wealthy and poor nations (Cook and Pincus, 2014). The great depression of the late 1920's and 1930's puts a stop to the economic development of the region (Evers, 1987). Unemployment rose sharply, and the period shaped

the seeds of political revolution that ended with the independence of most of the region's countries after World War II (Aspinall et al., 2011). However, the rise of development policies in the 1940's and 1950's made the economic development strategies of all the capitalist Southeast Asian States. The policies have drawn attention to the urban industrial planning (Berger, 2003), while agricultural development has been observed as complementary to industrial growth (Hort and Kuhnle, 2000). So far, these initiatives have met with mixed success (Berger, 2003). Indeed, international differences grew progressively (Cook and Pincus, 2014) and the trading patterns of the East Asian countries, however, have shifted over the time and has continued to be exporting raw materials and importing manufactured goods (Sally and Sen, 2011). Singapore has advanced the level of industrialization and became one of the world's great centers of industry and commerce (Chongvilaivan, 2012).

There is a great disproportion in the development of the region (Siah et al., 2014), particularly between the member and nonmember of the Association of Southeast Asian Nations (ASEAN) countries, i.e. Brunei, Indonesia, Malaysia, Philippines, Singapore and Thailand have experienced significant economic development (Sharma and Chua, 2000). However, the economy of the Philippines has grown at a much slower rate compared to other ASEAN countries (Gill et al., 2007). The countries, i.e. Cambodia, Laos, Myanmar and Vietnam could not follow the miracle path of sustainable development (Noland, 2013), that's why these countries are among the poorest nations in the world (Salazar and Das, 2007).

Since 1970, there are large differences in the patterns of structural change across the region (Serrano and Pinilla, 2014), with the cumulative growth projections in Malaysia and Thailand and collateral filters of labor laws allow only limited progress in the Cambodia, Laos, and Vietnam (Leung and Viseth, 2005). Hunger, food insecurity and severe malnutrition are fundamental challenges in the pockets of even the most developed countries (Timmer, 2014), but, they have been especially vulnerable in Cambodia because of internal conflicts and crop failure and the disorder of agronomy everywhere is plainly associated with restrained land, functionally the landless remains poor and ultimately experiencing the great poverty and poor health (Sedara et al., 2002). Landlessness peasants are perhaps most serious in the Philippines (Melgar-Quinonez et al., 2006).

Agriculture is a key source of income and an important trigger of economic growth in the region except Brunei and Singapore (Qiu et al., 2007). Agricultural employment, however, has been declining steadily due to rise in employment in the services (Park and Shin, 2012). More than two thirds of the workforce of Cambodia and Laos gain their livelihood directly from agriculture (World Bank Group, 2012), which is one of the most fundamental practices for the survival and wellbeing on a subsistence basis (ILO, 2006). Evidence from micro-studies of the ASEAN countries suggests that there is a considerable restructuring in the region toward the growth in industry and services (Hutton, 2003), however, these countries have still huge potential for further economic consolidation (Terada, 2011).

**Table 1: Establishment and Systems of Governance (ASEAN)**

	Independence		Name	Government	
	Date	From		Nature	Legal System
Brunei Darussalam	1-Jan-1984	United Kingdom	Negara Brunei Darussalam	Constitutional Sultanate	English Common Law. For Muslims, Islamic Sharia Law
Cambodia	9-Nov-1953	France	Kingdom of Cambodia	Multiparty Democracy under a Constitutional Monarchy Established in September 1993	Primarily a Civil Law Mixture of French-influenced
Indonesia	17-Aug-1945	Japan	Republic of Indonesia	Republic	Roman-Dutch Law
Laos	19-Jul-1949	France	Lao People's Democratic Republic	Communist State	Traditional Customs, French Legal Norms, and Procedures
Malaysia	31-Aug-1957	United Kingdom	Malaysia	Constitutional Monarchy	English Common Law
Philippines	12-Jun-1898	Spain	Republic of the Philippines	Republic	Spanish and Anglo-American Law
Singapore	9-Aug-1965	Malaysian Federation	Republic of Singapore	Parliamentary Republic	English Common Law
Thailand	1238 <sup>a</sup>		Kingdom of Thailand	Constitutional Monarchy	Civil Law System
Vietnam	2-Sep-1945	France	Socialist Republic of Vietnam	Communist State	Communist Legal Theory and French Civil Law System

(a) Traditional founding date, never colonized

Source: Central Intelligence Agency (2010)

Industrialization in the Southeast Asia is a primarily an indigenous phenomenon (Terwiel, 2013), much of the development policies have critical goals in the economies of the ASEAN countries (Dick and Rimmer, 1998); and, in all of them except Brunei, industry's productivity has grown considerably over the period (Hutton, 2003). The most apparent increases have acknowledged in Singapore, Thailand and the Philippines (Vallance, 1999). Small-scale corporation dominates in the region, both in term of the number of workers employed and the number of companies and agriculture product processing industries has a potent role in increasing concentrations of consumer goods industries in all nations (Phadungkiati and Connell, 2014). The manufacture of a variety of products, headed by electronic, electrical and transportation equipment industry is dominant, the conspicuous exception is Singapore (Athukorala, 2011). Textiles and clothing are considered as major sectors in Thailand, Myanmar and Philippines (Ofreneo, 2012), the growth of the chemical industry in Thailand increases due to robustness of domestic demand (Jayanthakumaran et al., 2013).

The value of major ASEAN countries' trade is about more than one third of the United States of America (Péridy, 2005). The most astonishing thing is that these countries are now influencing the global trade by using the market powers (Aizenman et al., 2011). On the other hand minor ASEAN countries are struggling for getting some share of trade from the ASEAN region. Exports, as a percentage of the GDP, are small in Cambodia, Myanmar, Vietnam and Laos and moderately in Thailand, the Philippines and Indonesia, extremely large proportion in Singapore, Malaysia and Brunei (WDI, 2014). The commodity composition of export portfolios



has got a paramount importance (Siah et al., 2014). In this aspect, Indonesian trade structure, dominated by oil, has been comparatively effective in expanding its exports toward, coffee, rubber, textiles, rattan and plywood (Basri and Hill, 2008).

**Table 2: Socio Economic Indicators of ASEAN Countries**

Characteristics	Brunei	Cambodia	Indonesia	Lao PDR	Malaysia	Philippines	Singapore	Thailand
GDP Growth Rate	0.95	7.31	6.26	8.02	5.64	6.80	2.50	7.67
Per Capita Income, (Current US\$)	41126.6	945.5	3551.4	1408.3	10440.0	2587.6	54007.3	5479.8
Exports (% of GDP)	81.36	62.79	24.29	38.84	85.25	30.78	195.07	74.97
Inflation	0.46	-	4.28	4.26	1.66	3.17	4.53	3.01
Unemployment Rate	3.80	0.20	6.10	-	3.00	7.00	2.80	0.70
Poverty Headcount Ratio	-	17.70	12.00	23.20	1.70	25.20	-	13.20
Population (Million)	0.41	14.86	246.86	6.65	29.24	96.71	5.31	66.79

Source: World Bank (2012)

In order to observe the major socioeconomic indicators like GDP growth, GDP per capita income, export percentage of GDP, inflation, unemployment rate and population in million are shown in Table 2 for the purpose of quick analysis of South East Asian countries.

The table depicts that the trend of per capita income in Brunei Darussalam and Singapore is admirable as compare to the other partner, while the GDP growth rates of Cambodia and Lao PDR are satisfactory. Unemployment rate of Indonesia and Philippines is high compared to other developing economies of ASEAN.

On the other hand, Malaysia, with a trade pattern of exporting palm oil, tropical hardwoods, and tin, now derives the substantial part of their export income from petroleum products (Ramasamy and Yeung, 2007). These earnings are stimulating the country's industrial base (Basri and Hill, 2008; Ramasamy and Yeung, 2007). Thailand attainments are much less from Petro-export structure, where food and differentiated goods and services account for almost all of its trade (Sawyer et al., 2010). On the contrary, Brunei relies entirely on its petrol-exports. Singapore is the only economy, which has utilized its unique geographic importance and the most competent human capital is available here to attract multinational corporations (Feridun and Sissoko, 2011).

Cambodians per capita income is expeditiously increasing, but it is very low as compared to other regional countries (Murakami, 2013). In 2010, Cambodian real per capita income was \$2,470 (purchasing power parity) and nominal per capita income was \$1,040 (UN ESCAP, 2010). Agriculture sector required substantial restructuring due to vast potential; most of rural households are dependent on agriculture and complementary sub-sectors (Sedara et al., 2002). The major exports, which are highly concentrated, are fish, rice, garments, timber, and

rubber (Sotharith, 2011). Tourism is considered as a fastest growing industry in Cambodia, with arrivals increasing from 0.2 million to over 2 million in recent years (Kelsall and Seiha, 2014).

Indonesia has an assorted economy in which both the private and public sectors are playing a growing and dynamic role in strategic adaptation of policies to control the feasible growth path. The country is an unprecedented economy of scale and dramatically increasing throughput and reducing the cost of the product as compared to other countries of Southeast Asia (Basri and Hill, 2008). Indonesia is the 27<sup>th</sup> biggest exporting country in the world (Durotoye, 2014) and the leading export commodities are oil and gas, plywood, rubber, electrical appliances, and textiles (Yusoff and Febrina, 2014). The gross domestic product is about \$1 trillion due to this huge share of the industrial sector, Indonesia is now a significant member of G-20 major economies (Felman et al., 2014), it is the world's 10 largest by real GDP, and its share in global economic output is 2.3 per cent (Laksmana, 2011). The industry sector is the economy's leading sector contributing 46% of annual GDP, the second substantial sector is services sector, having a share of 39% in the economy's total income and another significant segment of the economy is an agricultural sector, adding 14% income to economy annually (WDI, 2012). However, the service sector has engaged 48.87% of the total labor force more people than other sectors, traditional agriculture sector is giving chance to 38.3% of the entire labor force and industry sector occupying 12.79 % of the overall labor force (Wahid and Furuholt, 2012). The population of Indonesia is more than 237 million, with a 1.9% population growth. Java is the world most populous island and 58% of the population lives in Java. The population of Indonesia is expected to grow to around 269 million by 2020 (Akbar et al., 2012).

The economy of the Philippines is one of the leading economy in the world and its rank is 75th, with an estimated gross domestic product \$272.02 billion in 2013 (Nalla and Mamayek, 2013). The major exported items are semiconductors and electronic products, copper products, garments, petroleum products, transport equipment, fruit, and coconut oil. Multinationals in newly industrialized country are facing the dilemma of whether and when they can engage their capital. That's why the Philippines' economy is in evolutionary stage and has transitioned from agriculture to services and manufacturing (Athukorala, 2011). Labor force is around 37 million and mostly engaged in agriculture sector. The agriculture sector is giving the employment to 34.84% of the entire labor force, while contributing to GDP only about 16.12%. The industrial sector is facilitating 14% of the workforce and accounts for 29.8 % of GDP. At the same time, the 46.7% of the workers participating in the services sector are adding 55.9% of GDP (Bayangos and Jansen, 2011).

After Indonesia, Thailand is the second major socioeconomic player of the Southeast Asia; Thailand is a transformative industrialized country (Nguyen and Pham, 2011), and export dependent economy, export to GDP ratio is virtually increasing from 1960 (Sachdev, 2013). The share of industrial and service sector is more than 40 per cent (Nguyen and Pham, 2011), which highest in the entire GDP (Sachdev, 2013). Thailand's agricultural sector is a traditional sector (Rigg et al., 2012), which produces 8 per cent of GDP (Tongzon, 2002). The trade of logistics and communication sectors account for 13% and 10 % of gross domestic product respectively. The construction and mining sector contribute only 4% of the country's GDP.

Other sectors i.e. the education, financial, hospitality, telecommunication sector accounts for about one fourth of the country's gross domestic product (Gödecke and Waibel, 2011).

### ***2.3.2 Child Labor in ASEAN***

The ASEAN countries deserve rebuke for its working children during the past few decades, Cambodia, Thailand, Indonesia and Philippines are laced with child labor problem in this region. The IPEC finds out that Indonesia and Thailand involve extreme risks of child labor due to uncertainties and poverty. While Cambodia and Philippines pose extreme child labor complicity risks due to low scale industries (ILO, 2003).

It is generally believed that Cambodia's economic growth and development are a causal factor to the increase in the child labor. The dramatic increase in the demands of the construction is one example where construction industry has pushed children to work in brick kilns, foreclosing the opportunity of schooling for most of them (Ang et al., 2012). ILO (2003) reported that one in every ten children in the Phnom Pehn, the capital and largest city of Cambodia, above the age of seven years is involved in child domestic labor; young children have to work in the field work as scavengers and spend their time for rummaging in dumps for items that can be sold (Kim, 2011). Some children spend their time in the streets peddling. The tourist industry is also playing a key role in this form of child labor as many tourists are willing to buy from children, out of good intentions and social responsibility, mounting the demands. This strengthens the beliefs that teenagers are more appreciated in the streets than at school

(Maeve, 2011). World Bank (2008) confirms that 48% children from aged 5 to 14 are not attending the school and they are economically active (Kim, 2011). Many of these children have to work long hours and approximately 79,000 children between the ages of 6 to 17 worked 25 hours a week and did not attend the school (Despotis, 2005). When children are out of school, they are denying the skills and knowledge needed for state development. Without vital life skills and training, they are vulnerable to abuse and misuse, which may complicate and exacerbate the cycle of poverty in their families. Consequently, this lack of education will hold back economic growth in Cambodia. There is a need to re-estimate the child labor in Cambodia because child labor could be missing out on education (Kim, 2011).

There are more than three million children involved in hazardous work in the Philippines. Out of 29.8 million children aged 5 to 17, 45% are doing taught work and mostly boys are engaged in hazardous work (Gamlin et al., 2013). Sometime, these boys have jobs that place them in instant physical danger. These treats contain the experience of injurious chemical and sharp tools, that can be less recognizable but not less hazardous. Teenagers are obligatory to work very long time with a few breaks. Some of them are abused by their bosses, both substantially and psychologically (Hindman, 2009). Children in risky work are prevalent in the Bicol, Central, Luzon, Mindanao, Northern and Western Visayan island regions (Reyes et al., 2014).

Indonesia, the 4<sup>th</sup> most populous (Durotoye, 2014), and the largest Muslim population in the world (Abduh and Omar, 2012), about 30 per cent of the entire population are under age 15

(Foldvari et al., 2013). A significant effort has been made in expanding the access to school education, still, more than 4 million school age children do not attend school (Kis-Katos and Sparrow, 2011). Most of teenagers enter the workforce at a very early phase, and are helpless for exploitation in the worst form of child labor (Sen, 2013). Recent estimates indicate that there are more than 2.7 million children engaged in repeated antisocial acts with some involved in the worst form of child labor (Sim et al., 2013).

Thailand has made considerable efforts to eliminate the worst forms of child labor, therefore, set a minimum age for domestic work at the age of 15. For this purpose government passed the parliamentary regulations for domestic workers, which offers protections for domestic child workers, also updated the list of dangerous work (Hepburn and Simon, 2013) and working circumstances banned to teenagers and change the minimum age in sea vessels from 15 to 17 (Ratner et al., 2014). Children in the agriculture sector are exposed to unsafe tools and pesticides. Most of children face such problems in the sugar cane fields, but, only a few children face such situations in the production of roses, rubber, and oranges (Siddiqi and Patrinos, 1995). Children are taking part in shrimp and seafood processing industry and are subject to long, late hours in hard working situations and involve in heavy lifting (Ratner et al., 2014). Teenagers, mainly girls, sometime have to work in local services, and endure physical and sexual abuse from their employers (Sychareun et al., 2011). Young children are rewarded to fight in daring boxing called Muay Thai (Li and Wang, 2011). Teenagers are found in money making sexual abuse, including pornography. Children from Cambodia and Indonesia are traded

in Thailand for commercial sexual exploitation (Sychareun et al., 2011). Children are also trafficked into urban areas to sell and beg on the streets (Sankharat, 2013).

## **2.4 Background of the SAARC Countries**

SAARC includes eight countries: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. Its entire population is approximately 1.64 billion, which represents 23% of the world population. SAARC has many distinct qualities; all ideologies, faiths and religions of the world are gathered here. It has an imaginative irrigated farmland in the world with over 66 million hectares. It has one of the oldest living civilization in the world. It acquires the second largest rail network in the world after the United States of America. This region holds 450 million people in the workforce, which is the largest of any other economic zone. Consumer base surpasses 750 million reporting the largest number of consumers in a single economic zone in the world (Herath, 2012).

### ***2.4.1 Overview of SAARC Economies***

As far as, the SAARC is concerned, it is considered 3rd largest economy of the world in term of GDP (derived at purchasing power parity) and contributing US\$9. 05 trillion in global GDP, on the other hand, if it is observed for SAARC countries, it is at 8<sup>th</sup> number having share of US\$2. 5999 trillion (on the base of nominal GDP). SAARC nations represent 23% of the



world population and comprise 3.9 % of the world's area (Knox and McCarthy, 2014 and Chand, 2010).

**Table 3: Socio Economic Indicators of SAARC Countries**

Characteristics	Afghanistan	Bangladesh	Bhutan	India	Maldives	Nepal	Pakistan	Sri Lanka
GDP Growth Rate	14.43	6.52	5.07	4.73	1.33	4.85	3.50	6.34
Per Capita Income, (Current US\$)	690	950	2320	1550	5430	700	1250	2910
Exports (% of GDP)	5.51	20.16	38.72	23.99	111.31	10.70	12.39	22.83
Inflation	7.21	6.21	10.91	9.31	12.13	9.45	9.68	7.54
Unemployment Rate	8.7	4.5	2.1	3.6	11.1	2.7	5	4
Poverty Headcount Ratio	35.8	31.51	12	21.9	-	25.2	12.4	8.9
Population (Million)	29.82	154.69	0.74	1,237	0.33	27.47	179.16	20.32
Population (Share %)	1.81	9.38	0.04	74.98	0.02	1.67	10.86	1.23
Population (Growth Rate)	3.04	1.6	2.3	1.4	1.9	2.0	2.3	0.9

Source: World Bank (2012)

Table 3 shows that, SAARC economies are experiencing the economic crunches in the shapes of high inflation i.e. India, Maldives, Nepal and Pakistan, by comparing with per capita

income of these countries. High population growth rates and poverty indexes in Bangladesh, India, Pakistan and Nepal are changing the consumption pattern and labor composition in the region. Export to GDP ratios in the major SAARC countries like Bangladesh, India, and Pakistan are unsatisfactory for globalization. Under these circumstances there are high chances of child labor in these countries.

All SAARC countries stock market capitalization is 3.78% of the global stock market capitalization. The SAARC contribution of FDI in world FDI is 3.26%. Given tranquility and peace, FDI can register massive expansion as enabling environment can enable SAARC to capture a big share of mutual benefits for SAARC and global world (Kanungo, 2012). Table 3 shows a short summary of socioeconomic indicators, like GDP growth, GDP per capita income across, export percentage of GDP, inflation, unemployment rate and population, for the purpose of quick analysis of South Asian countries. The table depicts that the trend of per capita income in small countries i.e. Bhutan and the Maldives, is admirable as compared to major SAARC countries, on the other hand the inflation rates of these countries are very high. Unemployment rate of Afghanistan and Maldives is high compared to other economies of SAARC.

At first glance, SAARC countries seem to be homogeneous set of countries in term of their time of independence. All the countries in the Table 4, with the exception of Bhutan and Nepal used to be British colonies. Afghanistan is not included in the Table 4 due to different socioeconomic and geographical importance. Countries which were British colonies have almost similar governing structure and legal system from their British rulers. Eight countries of

the SAARC namely; Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka differ greatly in land area, GDP, population, trade patterns and way of governance. They have common borders with one another and these countries have more or less similar level of human resources and economic development (Zaman et al., 2013).

**Table 4: Establishment and Systems of Governance (SAARC)**

	Independence		Government		
	Date	From	Name	Nature	Legal System
Bangladesh	16-Dec-1971	West Pakistan	People's Republic of Bangladesh	Parliamentary Democracy	English Common Law
Bhutan	8-Aug-1949	India	Kingdom of Bhutan	Monarchy; special treaty with India	Indian law and English Common Law
India	15-Aug-1947	United Kingdom	Republic of India	Federal Republic	English Common Law
Maldives	26-Jul-1965	United Kingdom	Republic of Maldives	Republic	Islamic law and English Common Law
Nepal	1768 <sup>a</sup>		Kingdom of Nepal	Parliamentary Democracy and Constitutional Monarchy	Hindu Legal Concepts and English Common Law
Pakistan	14-Aug-1947	United Kingdom	Islamic Republic of Pakistan	Federal Republic	English Common Law
Sri Lanka	4-Feb-1948	United Kingdom	Democratic Socialist Republic of Sri Lanka	Republic	Mixture of English Common Law, Roman-Dutch, Muslim, Sinhalese, and Customary Law

(a) Unified by Prithvi Narayan Shah

Source: Central Intelligence Agency (2010)

India is a large country in this region with vast land area, huge population, the greater share of GDP and GNP in the SAARC and a large trading country as compared to other SAARC associates (Sharma, 2007). Pakistan and Bangladesh have some type of similar characteristics in this region. These two countries have identical GDP, GNP and population structure as compare to India. Their combined share of trade in the SAARC is comparable to India (Mahmood and Azhar, 2001). Sri Lanka is a small country in this region with a small share of total GDP, GNP, population and land area of SAARC. Trade share is also not very high, but Sri Lanka has its own importance in the region (Sharma, 2007).

The estimated gross domestic product of Nepal for being at over approximately \$19 billion, agriculture, services and industry accounted for 36 %, 48%, and 15% respectively of the entire GDP. While the industry and agriculture sector is contracting, the involvement of the service sector is increasing in domestic income. Agriculture sector holds 76% of the labor force, services sector employs 18.1% and manufacturing carries industry 6.2%. Agricultural yield includes rice, corn, tea, sugarcane, root crops, milk, wheat, and buffalo meat. Industrial sector generally involves the processing of agricultural products, including grain, tobacco, sugarcane, and jute. Its labor force is roughly 10 million suffers from a shortage of trained labor (WB, 2014). Nepal's economic growth adversely affected by the political instability, 4.9 % GDP growth rate in 2010-11 is considered to be the second highest rate in the post-conflict period (Shakya et al., 2012). Domestic income comes mostly from agriculture, construction, financial and other services. The percentage of deprived persons have dropped in recent years. The percentage of people living below the poverty line have halved from 53.1% to 31% in the last

seven years (Price and Bohara, 2013). Nepal has considerable potential of tourism due to spectacular landscape and diverse, colorful culture, but progress in tourism and hospitality industry has been lifted by political instability and inadequate infrastructure. The tourism industry is contributing nearly 3% in domestic income and is the second biggest source of foreign income after remittances (Gautam, 2011). Nepal's exports of mainly leather goods, hemp natural fiber, clothing, carpets, grain and jute goods total \$886 million. Import commodities of mainly gold, petroleum products, machinery and equipment and fertilizer total 2 billion US dollar (Thapa, 2012).

The countries of the SAARC region are at the similar stage of economic development. The share of the manufacturing sector is increasing in major SAARC countries. Each country has a specific role in the specialization of a narrow range of products. The specialization of a narrow range of products will not only source of cost effectiveness, but also improves the quality of their products (Batra, 2006). This dissertation will consider data from major South Asian Association for Regional Cooperation (SAARC) countries, namely, Bangladesh, India, Pakistan, Nepal and Sri Lanka. These countries have a major share in population and economy of the region. Approximately, more than 93% share of the whole region is captured by these countries. These countries have enough capacity to represent the whole region. Another reason of using major SAARC countries in our research is that the data base of these countries is well organized and reliable as compare to other countries. The other countries Afghanistan, Bhutan, and Maldives do not offer a reasonable comparative database (Zaman et al., 2013).

The SAARC region has huge capacity to make itself an effective trading bloc in the world. The share of SAARC countries in world population is about 23 percent and considered a large market with massive profit making opportunities. But the performance of these countries is unsatisfactory if this region compares with the trade performance of other regional alliances. After comparing the SAARC(South Asian Association for Regional Cooperation) and the ASEAN (Association of South East Asian Nations) regions, Batra (2006) comes to know that the performance of the SAARC region is unsatisfactory. By engaging in trade on the basis of product differentiation and economies of scale (due to large scale production), these countries can gain from the trade of differentiated products (Akram and Mahmood, 2012). Economists in the SAARC think that today's South Asia has a variety of common characteristics with the Europe of the nineteen century. Development of international institutions, rising nationalism and regional associations are new sense of political and economic interaction (Anderson, 2000). The mode of trade is also changing due to trade reforms in the world, accordingly, trade of differentiating goods is becoming popular in this region (Weeraratne, 2005).

#### ***2.4.2 Child Labor in SAARC***

The number of child workers in SARRC countries falls by some 10 million. Notwithstanding this performance, at the end of 2010 there were still over 21.6 million child workers, and half of them were engaged in unsafe work. The overall falling trends could not stop the rising numbers of children in economic activity in South Asia from 2006 to 2012 (ILO-IPEC, 2013). These figures underscore the significance of the remaining threats facing the

international community, they also give a clear expression of hope progress against the child labor is attainable, with substantial policy choices and massive commitment in the national and international level. Commitment to national and international level can only be possible due to trade openness in SAARC countries (Deacon et al., 2011).

Approximately 95% of child workers live in developing countries of which half of them belong to Asian developing countries. Within Asia, South Asia has a high frequency of child labor and this differ significantly between countries (Herath and Sharma, 2012). In SAARC countries, the incidence of child labor tends to be higher among boys than girls and in rural areas. A numerous participation rate for boys in the workforce is due to the fact that girls perform their duties in the informal sector (such as at home) which are challenging to capture by statistics (Fallon and Tzannatos, 1998). Urban children generally work on carpet, garment and textile related activities, small business and beedi (hand- rolled cigarette) industry together with their parents, at the same time, children in rural areas tend to work with their families in fishing, agriculture, forestry or small family ventures (Singh, 2005).

Child labor exhibits 12% of the entire labor force in Bangladesh. With the children engaged in economic exercises, 16.12 % are factory workers, 22.90% are seller/vendors, 5.71% are brick/stone breakers, 2.26% is in craft, 4.76% agricultural worker, 0.48% beggars and 0.68% in fish processing (Fassa, 2003). It is examined that practically 60% of child workers are engaged in the agriculture sector and 8% of the workers employed in the hand knotted carpet industry are child labor.

In Nepal, 90% of child workers are engaged in agriculture and household work and the rest of 5% are working in non-agricultural activities, including service and manufacturing industries (Bhukuth and Ballet, 2006). Of those who are engaged in non-agriculture sector, 1.8% is in transportation, communication and construction, 0.8% work as general technical workers and another 0.4% as sales workers and 0.8% work as production workers. There is a higher concentration of child labor in Nepal if compared with other countries in South Asia. Multiple indicator cluster surveys (MICS) and other state surveys found that 34.14% of children between the ages of 5-14 are involved in child labor, if it is compared with the South Asia region as a whole it is 12.04%. There are more young girls than boys are engaged in child labor activities, and the working conditions are worse in rural areas. The agricultural sector occupies 89% of the working children, while 1.38% of employed children are in the manufacturing sector, 0.31% child workers are part of the construction industry, 1.57% are working in wholesale and retail trade, 1.0% are laboring in hotline industry, and 7% are in other industries (UNICEF, 2012).

In Pakistan, 12% in manufacturing, 66% of child labor is found in agriculture and remaining 22% works in service related activities (Rosati and Rossi, 2001). It is evident that in South Asia most working children are found in non-tradable rather than in tradable sector and most of them are employed in agriculture along with their parents. The worse thing is that most of employed children work together with their parents, they are projected to danger in most circumstances. In agriculture sector, most children are exposed to toxic pesticides, while in manufacturing and construction sector they are exposed to deadly material



such as mercury, benzene and asbestos. There is no doubt that these work hazards affect children with physical and mental development during their formative years (Sharma, 2007).

The international community has serious concerns regarding child labor in SAARC region. The situation of child labor is different in different countries (Hidellage and Srivastava, 2012). Male children from the age of 10 to 15 are engaged in militant activities in Afghanistan and Pakistani areas adjacent to Afghanistan (Asal et al., 2008), as the developed states make their front doors less accessible this area for emergence of globalization in the form of increased openness through trade liberalization (Cochran, 2013). Similarly, the other countries like India and Bangladesh male children are taking part in dangerous activities, but, female from 10 to 15 years are pushed into prostitution business (McClarty et al., 2014). Militancy for boys and prostitution for girls both are associated with serious human rights violation in SAARC region (Mehdi, 2010). Trade liberalization is a tool which can bring the children out of the child humiliation in South Asia (Mansoor, 2004).

## **2.5 Major Developments in Child Labor Reduction**

The International Labor Organization (ILO) and the United Nations Children's Fund (UNICEF) have directed their considerations to the reduction of child labor worldwide. As a result of their contributions there have been significant cosmopolitan treaties and conventions, impeding child labor and diagnosing concrete measures for governments to adhere. Once a state sign a convention, UN agencies monitor compliance and hold states answerable for violations.

**Table 5: Key Achievements of the ILO to Combat Child Labor**

Year	ILO Conventions
1973	The key instrument of minimum age was adopted for admission to employment (15 or the age reached on completion of compulsory schooling) <sup>7</sup> .
1989	The UN approved the convention on the rights of the child, determining the right of the child to be protected from hazardous work and economic exploitation, and the refraining of regimes from engaging any person under 15 into the armed forces.
1999	ILO members mutually approved the convention concerning the immediate and prohibition action for the abatement of the worst forms of child labor <sup>8</sup> .
2002	The ILO produces its first comprehensive report on child labor and declared 12 June as world day against child labor. This arrangement supports more than 80 countries in formulating their own programs to control the child labor.
2004	First ILO worldwide study of the costs and benefits of eradicating child labor says that benefits would exceed the costs by nearly 6 to 1.
2006	The findings of the second global report on child labor an hope for the future, which says that child labor is declining worldwide, the ILO projected a worldwide campaign to wipe out the worst forms of child labor by 2016.
2009	The 183 ILO Member States mutually accept the Global Jobs Pact as a guide to recovery from the worldwide jobs and economic crunch. The Pact calls for overblown surveillance to attain the eradication and prevention of an increase of child labor, forced labor and discrimination at work.
2010	The ILO, published its third Global Report on Child Labor, warning that the pace and profile of development is not expeditious to attain the 2016 targets of eradicating the worst forms of extensive child labor.

Source: International Labor Organization Conventions (Various Years)

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<sup>7</sup> Convention No. 138

<sup>8</sup> Convention No. 182

The South and Southeast Asian countries are devoted to defeat the child labor, and this apart from different actions taken by individual countries of the SAARC and ASEAN. The ILO members in the SAARC and ASEAN region have ratified some of the ILO legal frameworks and the other conventions for eliminating child labor.

Cambodian state had ratified the convention 138 on the minimum age in 1999, and specified the minimum age to work to be the age of 14. Cambodian government signed the convention 182 on the worst forms of child labor in 2006, it is a remarkable step towards the elimination of the worst forms of child labor in Cambodia. In spite of this, a significant number of children to be found in Cambodian labor market (Kim,2011).

Indonesian government established a national action committee on the establishment of the worst form of child labor in 2001, and prepared a national action plan for the reduction of the worst forms of child through a three phase program over the next twenty years. The plan constitutes a time bound program to eradicate the worst forms of child labor. The legal committee of the national action plan has since taken steps to the legal framework to stop the child labor and child exploitation (Bessell, 2011).

Thailand has made considerable efforts to eliminate the worst forms of child labor, therefore, set a minimum age for domestic work at 15 years. For this purpose government passed the parliamentary regulations for domestic workers, which offers protections for domestic child workers, also updated the list of dangerous work (Hepburn and Simon, 2013)

and working circumstances banned to teenagers and change the minimum age in sea vessels from 15 to 17 (Ratner et al., 2014).

The Philippine has made a considerable progress in the efforts of child labor reduction in 2014. The national child labor committee (NCLC) is one of the milestones to eradicate the child labor in the Philippines. NCLC is an operational framework to finalize the strategic plan against child labor. Moreover, Philippine also rectified the all international conventions on child labor, i.e. ILO C. 182, Worst Forms of Child Labor, UN CRC Optional Protocol on Armed Conflict, Palermo Protocol on Trafficking in Persons, ILO C. 138, Minimum Age and UN CRC Optional Protocol on the Sale of Children, Child Prostitution and Child Pornography (US Department of Labor, 2015)

In 2013, Sri Lanka made feasible efforts to eradicate the child labor in 2013. National Steering Committee (NSC) reactivated to eliminate the child labor in all 25 districts, 755 Child Protection Committees are activated all over the Sri Lanka, and the main motive of this project is to make Sri Lanka, a child labor free country by 2016. Except Palermo Protocol on Trafficking in Persons, Sri Lanka ratified the all well-known conventions to eliminate the child labor (US Department of Labor, 2015)

**Table 6: ILO Convention Ratification Status of Member Countries**

Countries	ILO- Convention No 138 <sup>9</sup>	ILO-Convention No 182 <sup>10</sup>	ILO-Convention No 29 <sup>11</sup>	ILO-Convention No 105 <sup>12</sup>
Afghanistan	✓	✓	✗	✓
Bangladesh	✗	✓	✓	✓
Bhutan	✗	✗	✗	✗
Brunei	✓	✓	✗	✗
Cambodia	✓	✓	✓	✓
India	✗	✗	✓	✓
Indonesia	✓	✓	✓	✓
Laos	✓	✓	✓	✗
Malaysia	✓	✓	✓	✓
Maldives	✓	✓	✓	✓
Myanmar	✗	✓	✓	✗
Nepal	✓	✓	✓	✗
Pakistan	✓	✓	✓	✗
Philippines	✓	✓	✓	✓
Singapore	✓	✓	✓	✓
Sri Lanka	✓	✓	✓	✓
Thailand	✓	✓	✓	✓
Vietnam	✓	✓	✓	✗

Source: Various International Labor Organization Conventions

<sup>9</sup> ILO, 1973 Minimum Age Convention No. 138

<sup>10</sup> ILO, 1999 Convention on the Worst Forms of Child Labor No. 182

<sup>11</sup> ILO, 1930 Forced Labor Convention No. 29

<sup>12</sup> ILO, 1957 Abolition of Forced Labor Convention No. 105

In accordance with the Minimum Age Act, the age of working children differ between countries. For example, in Bangladesh the minimum age for work is 12 years, while in India and Pakistan, the minimum working age of 14 is practiced only to certain distinct activities occupations and processes (Chaturvedi, 1995). In Pakistan, the Employment of Children Act 1991 ban the hiring of children under age of 15 in hazardous or dangerous activities. Strategies are also installed for enforcement and execution of the act, such as the requirement that all entrepreneurs maintain a register of details regarding the recruitment of any children under the age of 15 (Sharma, 2007). In Nepal, the minimum working age of 14 does not apply to any exercises, such as brick kilns and plantation (Baker et al., 1997).

## **CHAPTER 3**

### **LITERATURE REVIEW**

#### **3.1 Chapter Overview**

Chapter 3 explains the literature review relevant to the child labor. It identifies, appraises, and synthesizes the research evidence and arguments. Moreover, this chapter incorporates the current knowledge in the field of both trade and child labor, including substantive findings, as well as theoretical, methodological and empirical contributions to situate the current research within the body of literature.

#### **3.2 Introduction**

A voluminous literature focuses on the new aspect of international trade and emphasizes the effects of market size on the international division of labor. Edmonds and Pavcnik (2005) claim that vast literature tended to focus on the determinants of child labor and explore the connection between international trade and the child labor. On this note, this section discusses the existing studies with a critical perspective, as well as provide a staccato review of earlier work reveals the different aspects of trade and child labor.

### 3.3 Theoretical Studies

In the theoretical literature on child labor the notable contributors are Basu and Van (1998), Basu et al. (2010), Ranjan (2001), Baland and Robinson (2000), Jafarey and Lahiri (2002) and Dessy and Pallage (2005). Trade liberalization, in a developing economy, is generous in inefficient and disorganized labor, likely to increase the relative rate of return to unskilled labor, thus diminishing the satisfaction to spend on skills and education. Therefore, the rewards to child labor raise with a substitution effect along with an increased supply of child labor (Doepke and Zilibotti, 2010). Trade openness does not increase the demand for child workers if children generally work in sectors that compete with imports or in the nontradable segment. On the other hand, some economists suggest that the effects of trade openness would be negligible (Doepke and Zilibotti, 2009).

Trade liberalization proponents advocate that economies have a desire to invest in skills and education in order to spur economic development and their long-run competitiveness (Tariq and Ab-Rahim, 2016). Ab-Rahim and Tariq (2016) examine that the trade liberalization might also lead to structural changes and sectoral shift from low skilled to higher skilled capital intensive manufacturing and services in the long run, thus making the recruitment of children less convenient.

A greater intensity of child labor could abate costs to gain the country a competitive advantage over others. Therefore, all economies face this incentive, increased trade intensity



could bring about a magnified incidence of child labor all over the world. Developing economies with tolerant labor standards, nominal wages and a plenteous supply of unskilled workers, including child laborers, are regarded as a haven for foreign investors, a perspective called the conventional wisdom by Doepke and Zilibotti (2010).

Trade liberalization in a developing country, will not only have a child labor substitution, but also a child labor income effect. Despite the fact that free trade is far from an accomplished fact and delicately assume that trade does increase the growth rate of the traditional economy (see Estevez, 2010) as well as, it enhances the relative rate of returns of incompetent workers. This child labor income effect can be expected to decline the benefits for parents with little skills to fire their children to work by assuming that child education and child leisure are normal goods (Basu and Van, 1998).

Basu et al. (2010) find out that parents in poor countries use extra income to move children out of work. This effect of additional income occurs even in the face of increased earnings opportunities for children. Along these lines, the patronizing view held by so many wealthy country researchers, that poor country parents somehow do not bother about the betterment of their children seems unfounded. These directions propose that the use of punitive income and sanctions against poor countries, where child labor is common, may not have the proposed impact. When children work as a result of poverty, then punishments and sanctions for the economies with child labor hardly seem to be favorable. A more impressive approach to

restrict the child labor would be to supplement treatment for income generating exercises with, possible, additional motivation for children staying in school.

The fluctuations and variations in earning channels and opportunities in developing economies are a cause of an increase in the demand for child workers. Labor markets arises from trade liberalization, some time, increase the child labor. Incidentally, children may be compelled to perform several activities customarily done by adults (Rees et al., 2012). Markusen et al. (1995) discover the association between trade liberalization and earnings tendencies, their arguments support the entry of foreign multinationals and earnings potentials of local workers. This occurs when the foreign companies apply market influence in local markets. However, Cigno et al. (2002) state that the trade liberalization not only affect the earnings opportunities of developing countries, but also increases the rich countries` capacity to control the policy in the poorer countries. As developing economies incorporate into the world`s economy and progressively depend upon world export markets to sell their goods and services, developed and wealthy economies can use the trade sanctions as a tool to force the policies that attempt to reduce the child labor (Cigno et al., 2002). Ray (2000) uses a strategic framework to examine the effect of stricter child labor policy on research and development when consuming labor-intensive. Doepke and Zilibotti (2005) shows that when countries set child labor regulations in a non-cooperative setting, a country benefits from a stricter policy abroad when it has high product standards at home. In a subsequent study, Rogers and Swinnerton (2008) analyzes the implications of non-cooperative child labor policy for local production externalities and concludes that the impact of international trade on the child labor is ambiguous.

Similarly, Webbink et al. (2012) uses a strategic framework to examine the effect of stricter child labor policy on research and development and obtain a broad overview of the degree to which children in different regions of Asia and Africa are involved in different forms of child labor. Edmonds and Pavcnik (2006) present a trade and child labor model, the study justifies the Ben-Porath (1980) in that he focuses on the investigation of the effects of trade policy on child labor. In a subsequent study, Edmonds (2007) analyzes the implications of child labor policy for local production externalities and concludes that impact international trade on the child labor is not clear. The study extends previous investigations that examine the link between child labor policy and modern international trade.

Krueger (1996) has indicated that in Heckscher-Olin framework, it is assumed that, developing countries are abundant in unskilled labor therefore these countries have comparative advantages in unskilled labor. Sign and Zammit (2004) find out that trade liberalization may not only provide the comparative advantages in unskilled labor intensive sectors for the developing economies, but also brings a comparative erosion of labor standards and adaptation of less labor intensive technology with high labor intensive techniques known as race to bottom hypothesis. The long term capital transfers from developed economies to developing economies plays an important role in comparative advantage. It is noteworthy that weak labor laws, low wage rates, lax labor standards and abundant supply of unskilled labor, including child workers are viewed as a haven for foreign investor. A country can gain comparative advantage on labor intensive goods by using a higher extent of child labor through cutting labor costs. Growth with the increased trade openness and penetration of FDI increases the demand of child labor and their

earnings (Edmonds and Pavcnik, 2006). As the wage rate of children engaged in the economic activity increases, the cost of opportunity for children to go to the school also increases. This relief supports the arguments of the parents about sending their children to work (Ranjan, 2001).

The new trade theory postulate that trade of differentiated products tends to be prevalent between countries that are similar in their factor endowments, technology level, skill levels, and so on. Thus, the trade of differentiated products will be the dominant trade pattern especially between countries at a similar level of economic development. It has been established that gains from trade will be large when economies of scale are strong and trade goods are highly differentiated (Krugman, 1980). Product differentiation and economies of scale that has internal to a firm thus formed the basis of the trade of differentiated products.

Krugman (1991) uses a two-region model to examine sector wise competition in labor demand in an imperfectly competitive market with increasing returns to scale. Krugman's theoretical model shows that competition in labor demand may result in driving the labor out of the market when the cost of labor is high enough. Notten et al. (2012) uses two regions to examine different levels of competition in labor behavior in an imperfectly competitive market. Their theoretical work shows that competition in poor countries may result in either driving the adult labor out of the market when availability of child labor high.

Role of unskilled labor in trade is also very important and such type of framework based on new trade theory is advanced by Egger et al. (2007). The authors build a two country model of skilled and unskilled labor, which assumes monopolistic competition. The framework examines the effects of trade in intermediate products on unskilled labor, output level and welfare under the conditions of the endogenous tax and skilled to unskilled labor functions. The framework provides interesting insights into the effects of trade in intermediate goods on the foreign unskilled labor level.

In the investigations of the “race to the bottom” in child labor protection laws, the evidence to support the hypothesis remains mixed. The “race to the bottom” concept, an offshoot of the inverted u-shaped child labor curve hypothesis, suggests that developing nations compete in lowering the stringency of child labor regulations in efforts to attract foreign investments from more developed nations. Developed countries are assumed to relocate the labor-intensive industries to avoid stricter labor standards at home (Bigelow, 1997). Singh and Zammit (2004) conclude that a “race to the bottom” in child labor policy is unlikely for both small and large countries, when standard intervention applies. However, the paper suggests that the relaxation of the assumption of immobile factors implies the possibility that freer trade induces capital flight from more developed countries with stricter child labor regulations to less developed countries with weaker regulations.

Singh and Zammit (2004) asserts that studies which provides empirical evidence to support the inverted u-shaped child labor curve hypothesis lends some credence to the

possibility of the race to the bottom in child labor policies among the developed nations. It is the primary argument of many anti-trade liberalization and workers' rights that trade liberalization results in a race-to-the-bottom<sup>13</sup>. These activists are supportive of the belief that free trade generates additional encouragement for competitive advantage, resulting in increased child labor to get the lowest labor rate possible. In the motivation for low cost labor, developing countries with weak labor regulations and abundant unskilled labor pools including children, are prime targets for corporations competing in the global economy (Singh and Zammit, 2004).

To date, Singh and Zammit (2004) is a unique study that proposes a general equilibrium analysis based on traditional trade and their study finds little support for the race to bottom arguments. There is some evidence that more openness increases the level of income, compliances with minimum wages, and reduces child labor. The authors developed a framework consistent with the Heckscher Ohlin model of international trade, but there is no model or framework for monopolistic completion to examine the effect of domestic child labor regulation.

Capital and labor market imperfections strengthen the underdevelopment trap of developing countries (Alan, 2011). Kaplan (2012) and Chamley (2012) examines the multiple

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<sup>13</sup> Baldwin & Krugman (2004) and Garretsen & Peeters (2007) suggest that a race to the bottom is partially materialized in new the trade theory. Developing countries have to use second hand or outdated technology from developed countries; this technology is less labor intensive but can be utilized product differentiation with the help of skilled labor.

equilibriums in the labor markets in poor developing countries due to interest rates. Van Binsbergen et al. (2012) argue that lower interest rates, offer better access to credit due to trade liberalization, may increase the employment and earnings opportunities available to poor households of a developing nation. But, Kanungo (2012) has a diverse opinion on this issue; he claims that trade liberalization attracts the foreign investor in developing countries and increases in the demand for local labor. Child labor and adult labor are substitutes (substitution axiom) thus low cost child labor is regarded as an utopia for foreign investors. Willis (1973) says “labor demand, expands the earnings opportunities of children” (Serra, 2009). Child leisure and child education are normal goods, but child labor is a luxury commodity to the poor households (luxury axiom); old age security of the parents behind the incidence of high backward society is a source of high fertility rate and lower investment in the education (Basu et al., 2010). Ventevogel et al. (2013) has found a justification in the need for old age security of the parents behind the tendency of the severe fertility rate and petty investment in the education of their children (and hence the high incidence of child labor) in a poverty-stricken community where the child labor rate is considerably high. Thus, it is recommended an improvement in legislation of compulsory education and health care services to eliminate child labor from the system.

Trade openness could thus be linked with a decreased incidence of child labor. Another probably positive effect of trade openness on the frequency of child labor through the effect of openness on interest rates and credit constraints. More open economies are likely to have lower interest rates and offer easy access to credit. This diminishes the opportunity cost of schooling

and thereby the intensity of child labor (Guarcello et al., 2010). From a political perspective, an open economy has less encouragement to secure the prominent traditional culture and institutional framework that endorses the child labor (Neumayer and De Soysa, 2005). Trade liberalization might be delaying the decision duration of the factors that regulate the child labor supply. Cultural and societal standards are more glamorous in developing economies, leading to a higher social acceptability of child labor (Neumayer and De Soysa, 2005). But the awareness level of parents naturally converges to natural norms, the social acceptability of child labor incidence reduces due to the trade liberalization. Subsequently, they may prefer sending their children to an educational institute instead of engaging them in work. Trade liberalization has an effect on the labor market adjustment and ethic in developing countries.

The financier and capital owner made their decision according to world market trends and have a low level of reliance on the local supply of inexperienced and immature labor, including children (Serra, 2009). In economies where the trade intensities are very low, efficient and skilled workers and the owners of capital naturally benefit from preserving the institutional culture. While, poor legislative conditions encourage the supply of low-priced unskilled labor, including that of children (Neumayer and De Sousa, 2005). If child labor is officially banned, but continues to exist due to lack of enforcement, then as Berik and Rodgers (2010) has noted violations of labor standards are more economical in the non-tradable and less exports oriented sectors. Berik and Rodgers (2010) had also found that the prevalence of child labor declines sharply with national income. According to them, the use of child labor is negatively related with the economic development. In addition, the governments of wealthier countries seem to



have more strictly controlled labor standards and better working conditions. Regulatory authorities of developing countries often have a scarcity of resources to implement the child labor bans.

Foreign venture capitalist and investors might be less involved in exploiting low-cost labor, including child labor. Market stability, market size and market expansion, economic and political stability, infrastructure and high labor expertise are also essential in determining the child labor (Hagestad and Uhlenberg, 2006). Most of the empirical studies typically fail to interrogate that, economies with lax labor standards in general and a gigantic incidence of child labor in particular attract a greater inflow of FDI (Brown et al., 2012). In as much as foreign direct investment spurs economic development (Herath, 2012), it also has a catchy effect for reducing the incidence of child (Brown et al., 2012). Foreign investors might also think it more problematic to avoid anti-child labor laws as they are apparently under great interrogation of executors and doubtlessly more exposed to the authorities of trade unions, consumer, human rights, the media and other opposition groups (Davies and Voy, 2009).

Banerjee and Nag (2013) collaborate the child labor and trade liberalization in two basic ways. First, trade liberalization may raise the earnings and employment potentials to poor families in developing economies. Variations in domestic labor markets from trade liberalization may decline or incline the child labor. Second, trade liberalization enhances the control of wealthy countries in the local policies of the developing world. Trade liberalization

can increase jobs and income in poor countries because of penetration of international investment or increases in the value of developing countries' export products.

It is observed that the governments of developing countries are coerced by the developed world about child labor policies. Pressure of wealthy nations can be effective in dropping the child labor when developing countries infiltrate into the global economy (Edmonds and Turk, 2002). Governments can reduce the child labor by giving grants to education facilitators and encouraging the children to go to school instead of work. For this purpose, compulsory schooling can be used as an instrument for regulatory authorities to stop children from working (Lopez-Calva, 2002).

When a country opens its borders for getting the access to the international markets, the foreign investment often, but not always, come into the country. This is the cause of an increase in the demand for local labor and hence increase the real wage rate. In addition, nowadays some developing countries have a comparative advantage in agriculture goods, and integration into international markets may increase the price of the export product to international levels. Thus, trade liberalization may increase employment and wages in these sectors (Davies and Voy, 2009). Trade liberalization can change the decisions of the factors that determine the child labor supply. Social mobility and cultural influence, are more influential and traditions in developing countries, accelerate the higher acceptability of child labor (Lopez-Calva, 2002).

Ray (2000) for Pakistan, Weeraratne (2005) for Sri Lanka, Kanungo (2012) for Bangladesh, Rees et al. (2012) for India, Dorji and Gyeltshen (2013) for Bhutan, consequently, Herath (2012), Singh and Zammit (2004), and Kaplan (2012) find that trade liberalization is one of the most common policy prescriptions offered to initiate the process of poverty eradication in today's poor countries. They agree on a single point that growth is likely the most important channel through which trade might lower poverty in the long run. These studies have emphasized the importance of short to medium run consequences of trade reforms. This focus is in part motivated by restricting mobility of individuals across regions and industries within poverty-stricken economies as a result of massive trade policy shocks differential impact of trade on poverty across regions and industries within poor economies that persist over a long period after the reforms. A high level of child labor coupled with low school attendance rates and income levels. For example, in India and Pakistan, 7-10 percent children of age 10-14 report working as their usual principal activity and 98 percent of these working children do not attend school at the beginning (Boockmann, 2010).

Trade reforms, by differently altering the local economic environment in which families operate and the resources available to families, might affect the parents' decision to invest in children. When the awareness level of parents converges to global norms (via trade liberalization), the general acceptability of child labor decreases due to social proliferation. As a result, these changes, parents start sending their children to school instead of work. Trade liberalization also affects the labor market regulations and standards in developing countries. (Edmonds, 2010).

Edmonds (2010) and Ray and Chatterjee (2012) emphasize on the effects of child labor and agricultural trade liberalization in a framework where adolescent frequently work on a family farm. This is not astonishing given that highest level of child labor worldwide rise in family farms or non-traded sectors. However, some advocates that trade liberalizations in agricultural sector (particularly in economies where a huge population depends on self-employed agriculture) might yield specific case studies because income effects linked with self-employed agriculture sector might have a tremendously meaningful role that would not be as pronounced during a trade reform. In addition, Dorji and Gyeltshen (2013) propose that the child work for compensation, rather than work on their clan and family farm, is the kind of job that interrupts most with schooling and thus it is a matter of greater policy interest. These are certainly disputed claims, the trade liberalization permit us to check out whether and how an economy-wide trade behaviors transfer in a country with relatively developed non-agricultural sector, and thus a tremendous tendency for children to engage themselves for wages in nonagricultural sector, affects child labor and schooling preferences.

The effect of trade, on hiring the children as labor in poor, especially agricultural economies have started an unmelodious debate. Research which reflects the analysis of actual data from developing countries and mathematical modeling both come to the general conclusion that poverty is the root of all evil, not capitalism or trade liberalization (Edmonds, 2010). Poverty limits access to education which has been shown to decrease child labor and improve the economic wellbeing of families. Through improved opportunities for education, greater integration into a global economy and trade liberalization has empirically been shown to drop

child labor volumes. The remedy of child labor is not very simple, but it is something that will take continued development and dedication to free trade and to trade liberalization overcome. Just as developed nations overcame their legacy of child labor through greater economic expansion, higher wages, and increased education opportunities, the developing world will be able to do so in the future as well (Edmonds and Schady, 2009).

If poverty is a major cause of child labor and children have to work either for the income or they cannot afford school fees, than the trade improvements in earnings opportunities can reduce child labor. When one child makes more in a poor family as a result of trade promotion, than other children of the same family may be able to stop working and they may be in a better position to attend school. Additionally, the increase in the parental earnings may support the family to reduce the work of school going children. Parents can get the substitutes for those goods which are produced by children previously, or they can utilize their increased income to alternative income earned by their children previously. Hence, trade liberalization is a best tool to help the parents in poor countries and stop the child labor without foreign intervention (Islam and Choe, 2013).

In the conventional literature, the supply of child labor has been attributed to factors such as failure of the educational system, the objectives of households to maximize present income, a dualistic economy characteristic of developing countries with the coexistence of formal and informal sectors. However, it is without any ambiguity that the root cause is helpless and abject poverty, which enforce the people to have a large size of households and adolescent

to go out in the labor market and earn their own means of livelihood. To eradicate the incidence of child labor, World Development Reports called for a multifaceted approach with programs that increase income security, reduce costs of education, and improve the quality schooling (Basu et al., 2010).

Emerson and Souza (2011) examine that labor market interventions raise adults' wages are expected to mitigate the problem of child labor. Ranjan (2001), Baland and Robinson (2000) and Jafarey and Lahiri (2002) are some unique studies which focus on capital market failure and emphasize the importance of capital-market imperfection as a contributing factor to inefficient child labor. On the other hand, Dessy and Pallage (2005) has advocated in favor of the imposition of compulsory education as a means to combat the incidence of child labor. Dessy and Pallage (2005) has shown that in an economy where the benefits of having children are outweighed by rearing costs, a policy of free education with no compulsory education laws, may lead the economy to an underdevelopment trap with a high fertility rate and higher incidence of child labor. On the other hand, an obligatory educational policy is expected to abate the presence of the child labor evil from the system.

The supply side mainly results from phenomenon such as poverty, education, household, and government decisions. The income levels of countries play a very critical role and has a strong link between the incidence of child labor and household income (Fallon and Tzannatos, 1998; Udry, 2006). Most studies noticed that the poverty of the household is an important factor in determining child labor (ILO, 1992; Grootaert and Kanbur, 1995). Basu and Van (1998)

avouch that poverty expedite the parents send their children to work since they do not see any substitutes. It is usually acknowledged that when the society is characterized by poverty and inequality, then the, incidence of child labor tends to increase (Bekele and Boyden, 1988; Grootaert and Kanbur, 1995). Krueger (1996) has found that the acuteness of child labor fell sharply with national income. He concluded that the child labor is negatively related to economic development. Moreover, the regulatory authorities of rich economies suggest to have stricter labor standards and better working conditions. The regulators of developing economies often absence of resources to enforce child labor laws. The anti- trade liberalization elements argue that market integration, augmenting the labor demand, enhance the earnings opportunities of young workers and thereby necessarily leads to more child labor. Some opponents of trade liberalization recommend the practice of trade sanctions against the exporting countries as a way to eliminate the child labor (Kis-Katos and Sparrow, 2011).

One reason frequently cited in inconclusive evidence in the study of trade child labor linkages is the lack of theoretical underpinnings to ground empirical prediction of the trade and child labor relationships (Edmonds and Pavcnik, 2006). More recently, formal theoretical frameworks have been advanced to provide a basis for empirical hypothesis. In particular, the theoretical framework developed by de Bell et al. (2007), based on the Heckscher Olin type trade model, provides an explicit description of the child labor impact of inter industry trade. An important contribution of the de Bell et al. (2007) framework is the formal presentation of the child labor impact of trade due to income effects or trade induced child labor technique due to differences between the countries. Although widely recognized, the income effect (trade

induced technique effect) postulated by Nardinelli (1980) has been investigated in earlier studies.

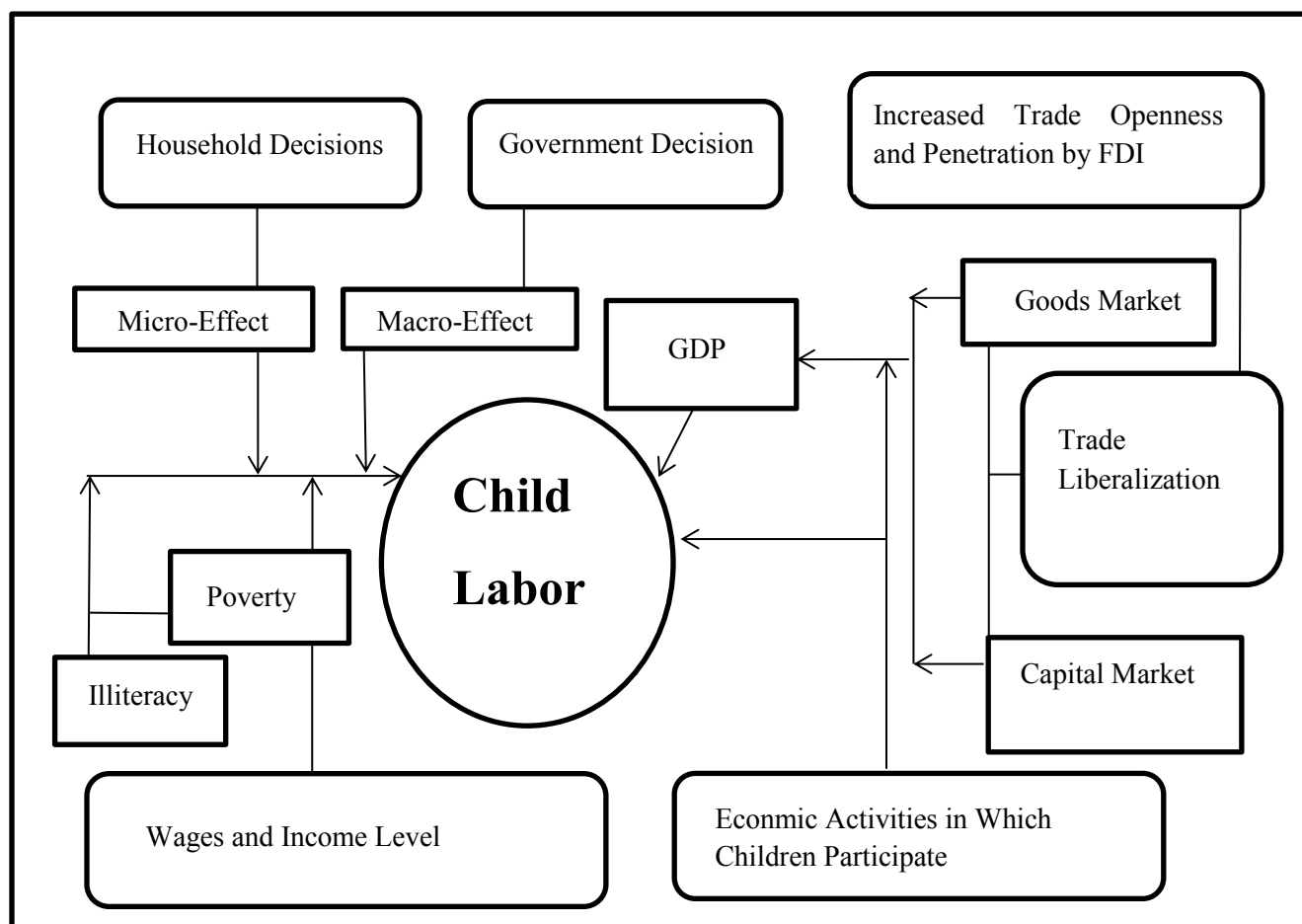


Figure 5: The Mechanism of Child Labor

Source: Acaroglu and Dagdemir (2010)

Recent development in modeling trade-child labor relationships contributes to providing theoretical underpinnings for empirical tests, most analyses are based on the traditional theory of trade. The Ranjan (2003) framework is based on the traditional framework of the trade,



which assumes constant returns to scale and perfect competition. In contrast, theoretical frameworks that examine the impact of trade on the child labor using modern trade theory are relatively scarce in the literature. There is yet a formal framework to delineate the impact of trade of differentiated products on child labor and to examine how structural parameters in a new trade model may clearly affect child labor. Furthermore, literature shows that most studies that are based on new trade focus on the issue of child labor policy rather than describing the effects of international trade on domestic child labor (Cigno et al., 2002). In particular, strategic behavior pertaining to the foreign capital inflow affects child labor regulation of domestic child labor is most typically examined (Fors, 2012).

The literature review shows the various causes of the child labor along with its economic reasons. Moreover, this review inquires that how child labor in developing continues to be affected by economic growth and trade liberalization, once it exists in developing economies due to trade liberalization as seen in Figure 5. According to Figure 5 there are two dimensions which constitute a child labor mechanism for demand and supply side. Firstly, It is made up by the factors that determine child labor supply and child labor is defined by household decisions, government decisions, education (illiteracy) and poverty. Secondly, it is made up of those factors that affects the demand side of child labor and related to the growth dynamics of economies that integrate with the global economy

### 3.4 Empirical Studies

The empirical literature on demand side factors of child labor is relatively scarce as compared to supply side factors i.e. household factors. Unfortunately, it is difficult to obtain firm level data on child labor, which can be beneficial to validate the results of this study and even the survey's reliability can be uncertain due to resistance by firms to disclose the information on the child labor and wages paid to these unlawful workers. Davis and Voy (2009) have empirically found a feeble connection between trade liberalization and child labor, by using instrumental variable techniques on macro level data. One of the drawbacks of macro-level data is an absence of data for the firms which are engaged in the production of differentiated goods by using child labor. The unavailability of reliable data on child labor issue necessitates a theoretical approach. At present, empirical examination has illustrated various findings on whether trade improves the economic stability of the country given the adverse effects of child labor (Edmonds and Pavcnik, 2005). The authors provide evidence that child labor increase in the initial phase of economic growth, but decrease in the later phase of development. However, the interesting findings of Kambhampati and Rajan (2006) give impetus to further and expansive research in the area, new data and more sophisticated statistical methods in subsequent studies do not provide conclusive findings as to the validity of the inverted u-shape curve (see Basu et al., 2010).

Subsequent investigations into other trade-child labor phenomena such as the race to the bottom hypotheses face similar mixed findings. In contradiction to the child labor, Dustmann et

al. (2010) find that trade and investment data suggest labor-intensive industries relocate to other industrial countries instead of to less developed nations (LDCs). Jacobs and Graham (2010) found that there is no direct data on turnover among school cafeteria young workers, concludes that other factors such as labor standards for workers, labor training, infrastructure and political stability, as opposed to cost-savings from labor regulations, play more important roles in the relocation decisions of food processing units. However, the empirical study by Singh and Zammit (2004) identifies a high cognitive performance in 26 developing countries to support the race to bottom hypothesis. Since the empirical study by Galor (2012) is based on the predictions of a formal theoretical framework, the study provides more persuasive evidence to support the validity of the substitution effect by short-run cost-benefit analysis.

Davies and Voy (2009) express child labor issue in two important ways: First, this study mainly addresses the trade openness, and also looks at penetration by foreign direct investment (FDI) defined as the stock of FDI over gross domestic product (GDP). Second, their research uses the labor force participation rate of 10 to 14 year old adolescent as the dependent variable in their main analysis, Clark (2011) examines the number of economic sectors in developing economies, in which expression of a child labor can be traced by using the primary school and the secondary school non-attendance rates.

Estevez (2011) finds that the comparative static results show that the policies have a positive impact on the child labor reduction and increase the welfare of unskilled labor another contribution of his work. The results show that an increase in FDI increase the welfare of the

economy and it has a positive impact on the return to the education and lead to a reduction in the child labor. It will have a positive impact on the improvement of human capital stock in the future and sustainable development this work is similar to Dinopoulos and Zhao (2007).

Bonnal (2010) employs a panel data approach to test the link between child labor and international trade. The results indicate that the economies which trade more and have a higher stock of FDI have less child labor. Iram and Fatima (2008) use multivariable vector auto regression (VAR) model for investigating the causal links between FDI, openness to trade and the child labor. They find that openness to trade raises the exportable sector and increases the demand for child labor in Basu (2002) framework due to the substitution effect while in Edmonds and Pavcnik (2004) setting this relationship is negative due to income effect. On the other hand, FDI is found to lower the incidence of the child labor. Kanungo (2012) interrogate the impact of FDI on child labor by using instrumental variable techniques. They show that FDI has a negative impact on child labor, however, they identify, this is biased by the endogeneity of FDI, and the impact of FDI is conveyed through its impact on per capita income.

Ray (2000) estimates the impact of household income on the schooling and child labor in Pakistan and Peru. Estimations show that child labor is negatively correlated with the household welfare. The interesting finding of this work is that in the case of more educated mother there is a less chance of child labor in Pakistan and on the other hand, in case of Peru there is no significant effect of female education on child labor.

**Table 7: Empirical Evidence of Child Labor**

Source, Year	DATA: Country, Year, Source, Observations.	Definition of Child Labor	Econometric Analysis Technique	Independent Variables	Findings
Doytch et al., 2013	100 Countries Data from 1999 to 2010 is drawn from DHS, MICS and other National Surveys.	Economically Active Children, Ages 10-14	The Blundell-Bond system GMM methodology	GDP per capita FDI/GDP Control of Corruption Population Density	Income and substitution effects of FDI vary across the sectors and regions.
Estevez, 2011	118 Countries Data from 1985 to 2007 is Drawn from World Bank and ILO in the Broadest Estimation.	Economically Active Children, Ages 7-14	Linear Least Squares Method	GDP per Capita. Trade Volume as a Percentage of GDP. Value-Added as a Share of GDP. Pupil-Teacher Ratio in Secondary Education.	Child labor is negatively correlated with FDI inflow, but the results are not conclusive due to limitations in the data.
Davies and Voy, 2009	145 countries data for the year of 1995.  The political freedom index comes from the Freedom House (2006)  Political rights index. From the CIA World Factbook (2006).	Economically Active Children, Ages 10-14	Fixed Effects to the Pooled Data.	FDI Income Trade Openness Freedom Index Ratify (ILO) Convention 138) Freedom Index	FDI has no effect on child labor

**Table 7: Empirical Evidence of Child Labor (continued)**

Neumayer and De Soysa, 2005	WDI, 2001	Economically Active Children, Ages 10-14.	Ordinary Least Squares (OLS)	GDP Per Capita.	Child labor is negatively correlated with FDI and positively associated with trade openness.
	UNICEF, 2003			Trade Openness.	
	UNCTAD, 2003			Expenditure on Health %age of GDP.	
	127 countries down to 33 at maximum.			FDI Relative to GDP.	
Blunch and Verner, 2000				Education Expenditure Share of GDP.	
	Ghana, 1997; CWIQ, 14514	9 to 14 Years Economically Active Labor and Not Going to School Past Four Weeks.	Uni-Variate Probit Model main focus is on the work/no work decisions	HH Socioeconomic Status Individual Characteristics i.e, Urban or Rural.	Positive association b/w poverty and child labor
	House Hold Survey	Household Chores are Not Included in This Definition.		Parental Characteristics	
	60,686 Individuals ranging from 5 to 14 years			Community Characteristics.	
Rossi and Rosati, 2001	Statical Information and Monitoring Program for the Child Labor (1996) 10,453 HH 30722 children engaged (from 5 to 14 years) in CL in Pakistan.	Ages 5 to 14 years	Simultaneous Equation model which combines a Tobit and Probit Model with correlated disturbances.	Individual Characteristics Parents Characteristics Sibling Number	Household income has a positive effect on school enrollment in Pakistan.

**Table 7: Empirical Evidence of Child Labor (continued)**

Ray, 2000	Peru Living Standards Measurement	Age: 6-17 (Peru) 10-17 (Pakistan)	Logit and Probit Model	HH Socioeconomic Status (Poverty)	Expenditure on education has a positive impact on school enrollment and negative impact on child labor.
	Survey 1994 (PLSS), 3623 HH, 5231	Child Labor Measured as		Adult (Female Education)	
	Children aged 6-17.	Time Spent in Wage		Individual Characteristics	
	Integrated HH Survey 1991, 4800	Labor and HH or Non-wage Labor.		Child's Gender/Age	
	HH, 5867 observations on children 10 -17 yrs.			Community Characteristics	
Deb and Rosati, 2001	Ghana Core Welfare Indicators	Ages 6 to 15 Years	Multinomial Logit Model with HH Level Random Intercept Latent	Community Schooling	Children who belong to poor families less likely to attend school.
	Questionnaire, 1997. 14514 HH.			Individual Characteristics	
	13484 Children, 6701 Nuclear HH With At least One Parent Present. Human			Household Characteristics	
	Development of India Survey, 1994, 34398 HH, 34211.			Education of Parents	
	Children, 16371 nuclear HH with at least one parent present.			Socioeconomic Status.	

Source: Various Studies

Blunch and Verner (2000) find that self-employed workers are likely to engage in harmful child labor and could not be able to attend school. Estimation shows that girls have to work more than boys. Finally, there is a small but positive relationship between poverty and child labor. Deb and Rosati (2001) examine the lowest income quintile of India and Ghana by applying multinomial logit analysis. Their analysis shows that in both countries` children who belong to poor families are less likely to go to school and contrast; there is a significant increase in the household income decrease the incidence of child labor. Rossi and Rosati (2001) find that household income has a positive effect on school enrollment in Pakistan. Hence, these two studies are very similar to each other and find the same evidence in different regions.

Empirical findings such as Neumayer and De Soysa (2005) reveal that child labor is negatively correlated with FDI and positively associated with trade liberalization. Trade liberalization might be delaying the decision duration of the factors that regulate the child labor supply. Cultural and societal standards are more glamorous in developing economies, leading to a higher social acceptability of child labor. In economies where the trade intensities are very low, efficient and skilled workers and the owners of capital naturally benefit from preserving the institutional culture and legislative conditions encouraging a large supply of low-priced unskilled labor, including that of children. Trade liberalization can affect the sources of economic growth, which creates the demand for child labor. The effect of growth on child labor demand is started, in the developing countries, with global dynamics of competitive advantage.



Amestoy and Crosbie (2000) use the predictions of the formal model to derive estimates equations for their empirical study in a single sector, and find evidence to support the claim that trade is not good for the child labor. More recently, Kis-Katos and Sparrow (2011) present both theory and empirical evidence to disclose the child labor effect. The authors find evidence to support the hypothesis that industries that have the most increase in the child labor sanctions the largest decrease in the net decrease the incidence of child labor. Empirical findings based on the theoretical predictions found in the studies such as Neumayer and De Soysa (2005) and Goldberg and Pavcnik (2004) are more likely to provide persuasive evidence to validate trade child labor linkages.

A recent empirical study by Chaudhuri (2011) offers an investigation into the relationship between trade patterns and child labor regulations under the traditional trade theory. The authors find that under Hechsher Oilin Vanek (1968) framework, there is statically significant evidence to support an empirical relationship between child labor regulations and trade patterns. On the other hand, Baldwin and Forslid (2010) under a monopolistic competition framework, find statically significant evidence to support a relationship between labor standards and trade of differentiated products. One shortcoming of the analysis is that the authors do not offer a formal framework to describe the relationship between child labor and trade variables. In short, the study does not have vertical underpinnings in the child labor context.

### **3.5 A Concluding Remark**

The review of theoretical and empirical studies suggests that the trade affects the child labor depending on types of trade induced effects. Trade-induced child labor selection and scale effects deserve substantial theoretical and empirical attention due to a distinguishing characteristic of the new trade theory. Based on the above-discussed studies, the traditional trade framework shows that international trade affects the scale of economy and scale of production and it has an impact on child labor. New trade theory talks about the product differentiation and increasing returns to scale; the beauty of Krugman's framework (1979) is that it explains the effect of trade on a number of firms that are engaged in the production of differentiated products in the home and foreign countries. Under the umbrella of Krugman framework, this study attempts to investigate the trade-induced child labor selection, scale and technique effects.

Literature that studies the link between the child labor and new trade focus on the issue of child labor policy. Most investigations into the trade-child labor relationships are based on the traditional theory of trade. There is no formal model that explicitly shows the impact of trade of differentiated products on child labor quality in the open economy context. In particular, the child labor impact of trade driven by economies of scale has not been explicitly differentiated from the child labor impact of trade driven by factor endowment differentials. Lastly, the theoretical and empirical analysis of the previous studies do not provide the effects of an increase in the stringency of child labor policy on domestic local regulatory quality levels in a model of monopolistic competition. The review of literature suggests that a large body of

studies is available that deals with the issue of international trade and child labor separately. Only a few studies are available that bridge the issues of both disciplines to assess their causes and effects. Besides, only a few studies provide the linkage between trade and child labor by using the framework developed by the new trade theory. To the best of undergone whilst studying knowledge, there is no study available for the SAARC and ASEAN region that examines the relationship between new trade theory and child labor. This dissertation is therefore an attempt to fill this gap by employing econometric methods for the purpose of estimating the new trade and child labor relationship in SAARC and ASEAN region.

## **CHAPTER 4**

### **THEORETICAL APPROACH AND METHODOLOGY**

#### **4.1 Chapter Overview**

This chapter identifies the theoretical framework to be used in the thesis. A model created by this research shows the principal actors involved in the production, trade and child labor activities. Methodology part describes the research approach, the scheme of the data collection and method of developing empirical scenarios finalizes this chapter.

#### **4.2 Theoretical Framework**

The terminology of trade liberalization is usually in practice to narrate the accelerated spread of global trade and investment. It has gathered the momentum at an extraordinary rate in the recent era of globalization, thus obliging the countries to be more interconnected (Mahmood and Azhar, 2001), and leaves with two options; either adapting development path immediately in order to gain from the prospects of prosperity (Edmonds, 2010), or blaming themselves to a permanent process of communicative, political, social and economic marginalization (Mahmood and Azhar, 2001).

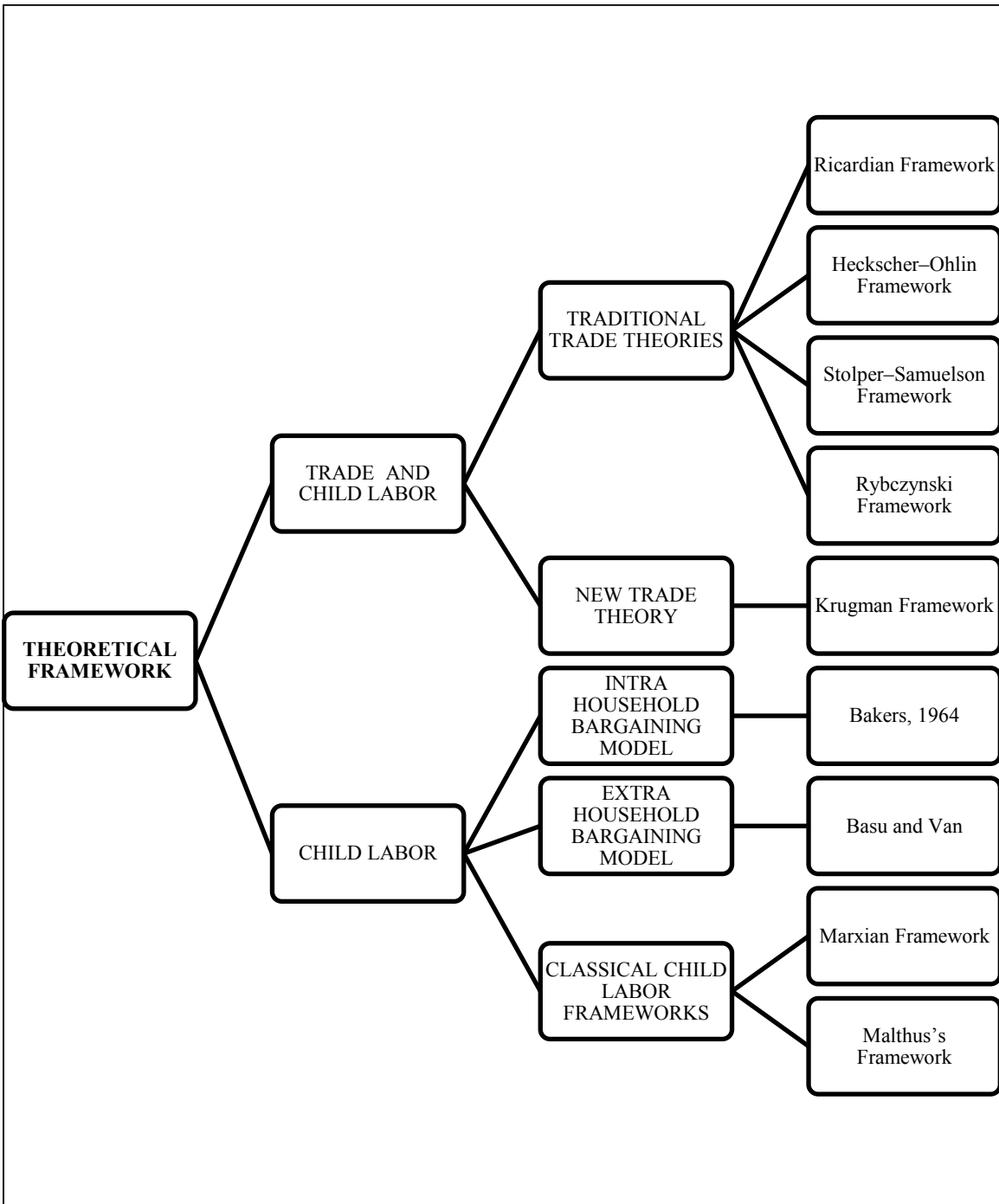


Figure 6: Theoretical Framework

Source: Various Studies

For Asian countries, a significant number of the world's working adolescent are to be traced, transformation to a trade liberalization basically means two things: firstly, they have an ability to enhance their exports and secondly, they have a greater capacity to bring a greater volume of foreign direct investment (Amjad et al., 2008).

The set trend shows that major technology in developing countries comes from the developed countries. Since there are relatively few case studies to derive a serious advancement on the relationship between trade liberalization and child labor. Trade and child labor literature tell us that child labor is essential to the competitiveness of less developed countries' industry in the global commercial markets. Child labor creates a competitive advantage of international trade in developing economies, while sometimes it discourages the foreign direct investment (Rule, 1985).

Comparative advantage theory of international trade (Ricardo, 1817) advocates that, free trade enables the economies to ensure both efficiency in production and allocation of resources. In Ricardian framework, there is a huge incentive for the children to work due to the single factor of production which is labor. In this framework the child labor and adult labor, both are identical in all aspects. That's why, in this domain, economies with labor intensive industries are blamed to be the major culprit of the child labor (Hanushek, 1992).

In Marxian Framework children are identified as a desired for survival and they are considered a production material. More specifically, the Marxian vision advocates that the

proletarianization<sup>14</sup> of the workforce brings about a fertility gain. Since, the working masses try to accumulate the factor of production over which they do have control (Smith, C. A., 1984). While, Malthus's vision designed on the belief of decreasing returns to scale<sup>15</sup> (Herrera, 2011), whereas the new trade theory assumes that the economy displays the increasing returns to scale (Krugman, 1979). In the Malthusian framework, there is a trade off between resources and human capital (Fraser et al., 2003). Less human capital has more resources to utilize but child labor cannot be protected in this framework due to decreasing returns to scale. It means every next unit of labor is more expensive as compared to the previous unit. It is also assumed that all the labor is constant in the production process and child labor and adult labor are substitutes. This substitution may be harmful in the mitigation policies of child labor in Malthusian framework (Schultz, 2009).

Conventional trade theory anticipates that an increase in exporting commodity price may either decrease or increase the child labor, but it is based on the magnitudes of the income and substitution effects (Edmonds and Pavcnik, 2005). The literature suggests that the studies which examine the relationship between child labor and trade under the new trade theory are relatively scarce. In contrast, the mostly trade models examine the effects of international trade on the child labor are based on the traditional trade theory. Traditional trade theory advocates that the exchanges of goods and services is simply determined by relative factor differentials across the

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<sup>14</sup> In Marxian framework the proletarianisation is mostly seen as the most significant form of downward social mobility (Rule, 1985).

<sup>15</sup> Output increases by less than the proportional change in inputs (Neumann et al., 2010).

countries on the basis of specialization in the production of goods in which the trading country has comparative advantage. Traditional trade theories assume that technology yields constant returns to scale<sup>16</sup> in production, and markets are classified as perfect competition<sup>17</sup>. With this philosophy, economies deal in homogenous goods and services with each other. The advancement in the global trend of trade in differentiated products<sup>18</sup> suggests that the trade of differentiated products is a dominant phenomenon in the worldwide exchange of goods and services. It demonstrates a substantial volume of trade flows for countries that are engaged in trade in differentiated products. New trade theory illustrates the trade as being driven by the specialization in, and the demand for, differentiated goods. The new trade theory relies on increasing returns to scale in production. Under these assumptions, trade may occur between countries with similar factor endowments and identical technologies, rather than between countries that are different in both aspects.

Lancaster (1980) proposed a model, by using differentiated goods, in which consumers can vary in their “ideal variety”. However, Spence (1976) and Dixit and Stiglitz (1979) suggest an isolated consumer demanding multiple varieties or differentiated good, and they introduced a terminology the “love of variety”. Lancaster (1980) and Helpman (1981) also adopt the “ideal

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<sup>16</sup> Production function which displays an equal proportion of inputs and outputs in the same direction (Ethier, 1982).

<sup>17</sup> A situation in which infinite buyers and sellers exist, they are well informed and the market price of a goods is above the control of particular buyers and sellers (Stigler, 1957).

<sup>18</sup> The process of distinguishing a product from others, to make it more charming (Grubel et al., 1975).



variety” approach in international trade models, while Krugman (1979, 1980 and 1981) carried forward the “love of variety” idea due to Dixit and Stiglitz (1979) concept of specialization under monopolistic competition. The extensive investigation by Helpman and Krugman (1985) shows that these two approaches are afforded in trade literature, so this thesis will use the similar “love of variety” approach as given by Krugman (1979). Feenstra (2003) describes this concept in a fascinating way and explain that the total number of varieties (number of firms) in a region necessarily falls with trade liberalization and the remaining firms have to increase the production to fulfill the market demand.

The primary purpose of this research is to provide new insights regarding the impact of international trade on the child labor by using new trade theory. Furthermore, this research is an empirical effort to explore the relationship between the child labor and the selection, scale and technique effects for the selected SAARC and ASEAN countries which are engaged in the trade of both differentiated and homogeneous goods. Finally, it examines the effect of trade intensity on child labor. There has not been an empirical study that specifically addresses factors which influence the child labor, in the production and trade of differentiated products, namely the selection, scale and technique effects. Notably, the selection is specific to the trade of differentiated goods and a unique contribution in trade and child labor literature. Additionally, the scale and technique effects arising from the production of differentiated goods have not been explicitly shown to generate similar effects as the scale and technique effects arising from the production of homogenous goods. In this research, the consequences of child labor due to

trade of differentiated products are integrated with the child labor effects of trade of homogeneous goods.

### **4.3 Conceptual Framework**

Trade expands the consumption basket and enables the consumers to use both local and imported varieties of goods. Krugman's (1979) framework of international trade states that the industrial sector, having features of increasing returns to scale and total number of firms in the industry shrinks although each one of the remaining firms produces more than before (Feenstra, 2003). At the same time, when income level of a country increases due to trade openness; the country implements stricter child labor approach, which causes amplified child labor reduction activity (Edmonds, 2007 and 2015). The increasing returns to scale in Krugman's framework compile the producer to hire more efficient and skilled labor to raise the production level. This framework has a potential to support the child labor elimination policies and discourage the child labor, because the producer wants to produce more and additional unit of adult labor is not expensive for him due to increasing returns to scale. The new theory suggests that the increase in the trade liberation shrinks the number of the firms in the locality; only the competitive firms can survive in the region other non-competitive firms have to exit from the competition. Therefore, the child labor in the competitive environment decreases.

Figure 7 shows that in the open economy, free trade generates trade induced child labor selection, scale and technique effects. When trade opens, countries expand production, but the

number of firms in the economy falls. This framework contains three predictions concerning the impact of trade on the productivity of firms: one, some firms are forced to exit (selection effect), two, surviving firms expand their outputs (scale effect), and finally these results provide a basis for the technique effect, which leads to higher income levels, which induces better technique of production undertaken by the firm.

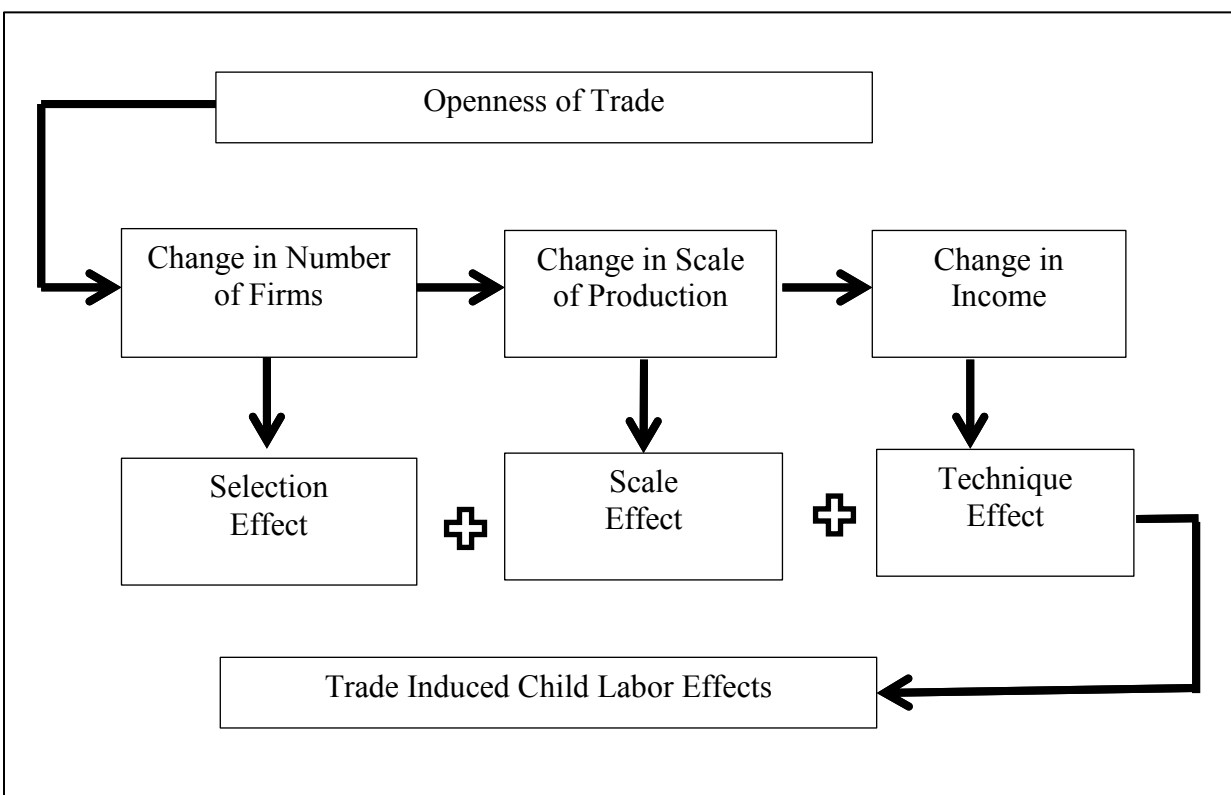


Figure 7: Trade Induced Child Labor Effects

In Figure 7, the trade induced selection effect is an avenue through which child labor in a country can change following trade liberalization. In particular, the least efficient firms have to exit. The remaining firms which are relatively efficient and reluctant to use child labor in the

production are free to raise the productivity. Under these two circumstances the technique effect is sourced from the cross-country diffusion of efficient techniques. In simple words, the figure explains that holding the scale effect and other determinants constant, the technique effects refer to the turnabout in the child labor as a result of adjustments to the income level due to trade intensity.

Based on theoretical and conceptual frameworks, this dissertation proposes the following hypotheses about the trade-child labor relationships which describe the impact of both trade of differentiated products and homogeneous goods on child labor.

#### ***4.3.1 Hypothesis 1***

*Child labor is increasing in the level of the scale of production, or positive trade induced child labor scale effect.*

Consider an economy with a labor-intensive sector that produces differentiated goods. Then, the production of differentiated goods corroborates that the scale of economic activities determines child labor in the economy. Given technology, an increase (decrease) in scale of labor intensive industries leads to an increase (decrease) in the labor demand (Hamermesh, 1987), child labor is a substitute of adult labor and child labor is parsimonious as compared to adult labor (Basu and Tzannatos, 2003), so an increase (decrease) in labor demand leads to an increase (decrease) in child labor demand. Theory suggests that the scale effects implies a

positive relationship between labor and the production of labor intensive goods (Hamermesh, 1987, 1996). In fact, researchers as far back as, Marx (1867) has argued that variation in child labor is primarily labor demand driven (Edmonds, 2007). In the current analysis, the direction of the effect of the scale on the child labor is similarly expected to be positive.

However, in contrast to the past studies, the current study assumes that the trade-induced scale effect represents the expansion of industries due to trade. Hence, the scale effect in the current analysis assumes that an increase (decrease) in the scale of production is not only due to the expansion (contraction) to the production of goods with comparative advantage, but it is also due to an expansion (contraction) of economies of scale. Consistent with the theories, the aggregate scale effect of trade of differentiated products is assumed to be increasing in the child labor.

#### **4.3.2 Hypothesis 2**

*Child labor is negatively associated with income level due to changes in trade intensity, or negative trade induced child labor technique effect.*

In an economy, on the one hand, the child labor regulation moves towards reduction and elimination of child labor in autarky situation (Weiner, 1991). On the other hand, an increase in the trade intensity increases the nation's wealth, this prosperity oscillate the nation behavior towards the labor amelioration (Karlan and Valdivia, 2011). Holding the scale effect and other

determinants constant, the technique effects refer to the turnabout in the child labor as a result of adjustments to the income level due to trade intensity. Literature suggests that, assuming child labor is unskilled and income levels are tied to trade intensity, then the trade induced child labor technique effect or income effect reduces the child labor in the economy.

Income levels influence the child labor policy, negatively associated with child labor. An increase (decrease) in income level implies stricter (more lax) policy which leads to an inverse change in child labor intensity. This implies that holding the scale and selection effect constant, higher income levels lead to lower child labor. Thus, the current analysis hypothesizes a negative relationship between child labor and income level.

#### **4.3.3 Hypothesis 3**

*Child labor is decreasing with the decrease in number of firms, or positive trade induced child labor selection effect.*

In the model of Krugman (1979), firms are identical in size and production technology. With trade, consumer chose to consume foreign products resulting in a decrease in the consumption of domestic varieties. The fall in the number of domestic product varieties leads to the exit of unprofitable firms. Assuming the scale and techniques of production remains unchanged, a smaller the number of firms in an industry implies less labor activities, which means less child labor. Hences, everything else equal, openness to trade implies a fall in the

number of the firms which leads to a fall in the child labor. In other words, the child labor is decreasing in the number of firms, *ceteris paribus*.

#### **4.3.4 Hypothesis 4**

*The child labor is decreasing in the trade intensity or openness to trade.*

The impact of free trade on child labor is measured by the variable defined as the ratio of trade volume to GDP, namely, trade intensity. In this analysis, it is postulated that freer trade leads to lower child labor. This hypothesis is consistent with findings in Neumayer and De Soysa (2005). There are many reasons why openness to trade may contribute to the improvement of the child labor situation. One reason is that greater openness to trade implies an increase in trade flows which leads to an expansion in the scale of overall production. Consequently, income level rises, which implies a stricter child labor policy that stimulate the amelioration and lower child labor intensity (Grootaer and Kanbur, 1995). Further, openness to trade may accelerate an inward flow or diffusion of more efficient techniques which contributes to reducing child labor intensity. Therefore, holding other factors constant, greater openness to trade leads to a negative growth in the child labor.

#### **4.4 The Model**

The model formulated in this research is an extension of Krugman (1979) framework of international trade, provides an elegant account of the trade of differentiated products based on the monopolistic competition and increasing returns to scale, by incorporating the child labor to examine the impact of trade on child labor. This section analyses the characteristics of closed economy along with an open economy. In this model, there is a Chamberlin economy in which firms are producing differentiated and imperfectly substituted goods; firms has some extent of market power and the key objective of these firms is to maximize their profits; non zero profits indulge the firms to enter or exit in the monopolistic competitive environment. Consumers, firms and regulatory authority are major players of the economy; monopolistically competitive market structure exists in the economy along with increasing returns to scale in production process, due to economies of scale each firm is producing only one type of product variety. Producers are equal, expect their design of production; similarly, firms are producing differentiated goods with a large number of potential varieties by using identical technologies.

Firm behavior is independent with other firms in the market due to production of large number goods and this production has a negligible effect on the market price and demand of other goods. In this framework labor is a single factor of production and this labor is inelastically supplied in a competitive market. Income and wages are interdependent because income comes from wages in the economy. Buyers and sellers have all possible information due



to which there is an instantaneous adjustment to the change in variables. Countries, in this framework, are considered similar in different aspects like technology, preferences and size.

In the economy, there are  $N$  number of consumers having similar preferences and utility function is separate-able with the preference of variety with respect to consumption of goods. The positive utility is obtained by using  $i_{th}$ , good and a mildly negative utility <sup>19</sup> is associated with child labor, but the utility of leisure is excluded due to Krugman (1979) model constraints. Horizontally differentiated products symmetrically enter into utility function. Social damage comes from child labor, due to weak regulation in the society and consumers have no control over child labor. Therefore, the consumer can only maximize its utility by consuming goods. Thus the utility function can be written as.

$$U = \sum_{i=1}^n V(q_i) - \sum_{i=1}^n \varsigma l_i \quad \dots (1) \quad V' > 0, V'' < 0$$

The consumer can maximize his utility by using its income which is equal to his wage, wage of child labor depends on age of child worker ( $\theta$ ), the consumer maximization is as follow:

$$Max_{\{q_i\}} U = \sum_{i=1}^n V(q_i) - \sum_{i=1}^n \varsigma l_i (15 - \theta) \quad \dots (2)$$

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<sup>19</sup> Higher level of marginal disutility from children engaged in economic activity (Reggio, 2011).

subject to:  $y = w$  and  $5 \leq \theta \leq 15$

where  $y = \sum_{i=1}^n p_i q_i$ ,  $p_i$  denotes the price of  $i^{\text{th}}$  goods. For maximization of consumer utility the first order condition is as follows:

$$v'(q_i) = \lambda p_i \quad \dots (3) \quad i = 1, 2, \dots, n$$

Where  $\lambda$  is the marginal utility of income and langrange multiplier. The share of each variety in the budget is insignificant due to enormous varieties of goods and services; therefore, the price impact of marginal utility of income can be avoided (see Krugman, 1979). The effect of a change in price implies that the elasticity of demand for variety  $i$  can be written as:

$$\psi_i = \frac{dq_i}{dp_i} * \frac{p_i}{q_i} = - \left( \frac{v'}{q_i v''} \right) > 0 \dots (4) \quad \frac{d\psi_i}{dq_i} < 0 \quad (\text{see, Krugman, 1979})$$

Hence, the elasticity is increasing as move up along with demand curve but consumption is falling.

Krugman (1979) suggests the linear function of labor output along with identical technologies having increasing returns to scale. The returns to scale is internal to firm having initial positive fixed cost, declining average fixed cost and the most important constant marginal cost. The output  $x_i$ , is an increasing function of labor:

$$N_i = \alpha + \beta x_i \dots (5) \quad \text{such that : } \alpha \text{ \& } \beta > 0$$

Where  $\alpha$  is fixed cost of production and  $\beta$  is the coefficient of variable cost. Hence, following equation shows the relationship of child labor and output.

$$\varsigma l_i = N * x_i \dots (6)$$

In the model locally engaged children are under consideration, it is also assumed that government or regulatory authority is not directly involved in the amelioration of labor, the regulatory authority can use child labor penalty as a policy tool and firms have to pay a high price in form of child labor penalties for engaging a child labor. In this framework, the child labor penalty is determined exogenously, in response to the implementation of child labor regulation. Firms try to avoid costly child labor penalty payments. In this model, costly child labor penalty payments are taken from the output that a firm produces by using labor including child labor. Therefore, firms allocate a proportion of output for the child labor penalty payments, only in case of engaging the child labor and allocate remaining portions for goods consumption in the market.

If a firm allocates  $x_i^a$  unit of output in amelioration of labor, then net output:

$$x_i^{net} = x_i (1 - \hat{A}_i) \dots (7)$$

Where  $\hat{A}_i = \frac{x_i^a}{x_i}$  is the allocation of resources from output towards hiring more skilled workers and terminate the less skilled workers (or child labor) engaged in the production process, this process in the current research is called amelioration. The individual consumers are also taking part as workers in the production of goods, the total labor force in the economy is  $N$ . Then, the supply is equal to demand of produced output, this relationship can be expressed as:

$$(1 - \hat{A}_i) x_i = Nq_i \quad \dots (8) \quad 0 < \hat{A}_i < 1$$

Where  $(1 - \hat{A}_i)$  is the fraction of output, which is allocated for consumption. This research specifies the functional form for child labor to describe the relationship between child labor and output, which is consistent with the approach of specifying the production technology in Krugman (1979,1980) models. This child labor intensity takes the following form:

$$\varsigma l_i = (1 - \hat{A}_i)^\sigma \quad \dots (9) \quad \sigma > 1$$

The parameters  $\sigma$  measures the responsiveness of a change in child labor due to changes in the fraction of output allocated towards the amelioration. The greater the value of responsiveness measures ( $\sigma$ ) means that lesser child labor, similarly the greater the value of amelioration ( $\hat{A}$ ) the lesser will be child labor. Generally, in labor intensive industries such as manufacturing and agriculture, labor demand increases at an increasing rate with the increasing allocation of resources towards the production of goods and child labor demand is directly

associated with labor demand in the economy due to substitution effect. In simple words, the scale of production can increase the demand for child labor, keeping other things constant in an economy. Therefore, for the functional form specified above, the assumption that  $\sigma$  is greater than one is reasonable and has a basis in the practical sense.

**Table 8: Explanation of Important Symbols**

Variables	Explanation
Amelioration ( $\hat{A}$ )	Amelioration is the allocation of resources from output towards hiring more skilled workers and terminate the less skilled workers (or child labor) engaged in the production process, this process can be illustrated as ( $0 < \hat{A}_i < 1$ ).
Measures the Responsiveness ( $\sigma$ )	The parameters $\sigma$ measures the responsiveness of a change in child labor due to changes in the fraction of output allocated towards the amelioration. The greater the value of responsiveness measures ( $\sigma$ ) means that lesser child labor.
Child Labor Penalty ( $\tau$ )	The child labor penalty, $\tau$ , is taken to be high enough so that firms choose to undertake child labor amelioration activity. If regulatory authority does not impose child labor regulation then it is equal to zero. In the absence of child labor regulation or at zero child labor penalty firms have no incentive to restrict the child labor in the society.

The child labor penalty,  $\tau$ , is taken to be high enough so that firms choose to undertake labor amelioration activities and avoid from child labor. If regulatory authority does not impose child labor regulation then it is equal to zero. In the absence of child labor regulation or at zero child labor penalty firms have no incentive to restrict the child labor in the society. This model without child labor entanglement would be quite similar to the Krugman (1979) model of monopolistic competition.

The profit function, denoted  $\pi$ , is the firm's revenue less labor cost and child labor penalties given by the following equation:

$$\pi_i = p_i (1 - \hat{A}_i) x_i - w(\alpha + \beta x_i) - \tau \varsigma l_i x_i \quad \dots (10)$$

Since all the firms are identical, symmetry across firms implies that

$$p = p_i$$

$$x = x_i$$

$$\hat{A} = \hat{A}_i$$

$$\varsigma l = \varsigma l_i$$

Henceforth, subscripts are suppressed.

#### 4.5 Monopolistic Competition and the Child Labor

The profit function is the firm's revenue less labor cost and child labor penalties such that:

$$\pi_i = p_i (1 - \hat{A}_i) x_i - w\alpha - (w\beta + \tau \varsigma l_i) x_i \quad \dots (11)$$

Where in monopolistic competition  $P = AR = ATC = LRAC$

$$p = p_i (1 - \hat{A}_i) x_i \quad \dots (12)$$

## 4.6 Trade Induced Child Labor Effects

In the autarky case the child labor penalty is considered as preponderant moral sentiment (see also Appendix A), while in the open economy case trade provides a sustainable, scalable and replicable solution to combat the child labor locally and globally. Changes in the trade intensity can have important implication effects on the consumer welfare as well as on economic preference. If a country wants to have a better quality care for vulnerable children, for example, in the form of no child labor is desirable, then, trade liberalization can be the best compliment for the policy makers. However, trade liberalization affects the production decisions at the aggregate level. Hence, in the developing economy, there exists a trade-off between the achievements of labor amelioration and economic objectives.

### 4.6.1 *Effect of Trade Openness on Child Labor*

The effect of a change in trade intensity on child labor is given by the following:

$$cl = \left( \frac{w\beta}{T(\sigma-1)} \right) \dots (1.1)$$

$$\frac{\partial cl}{\partial T} = -T^{-2} \left( \frac{w\beta}{\sigma-1} \right) < 0 \dots (1.2)$$

$$\frac{\partial cl}{\partial T} = -T^{-2}(cl) < 0 \dots (1.3)$$

This result is consistent with the theoretical expectation that the greater the trade liberalization, the lesser will be the child labor.

**Table 9: Trade Induced Child Labor Effects**

Trade Induced Child Labor Effects	Explanation
Scale Effect	Holding all other factors constant a change in the growth of the economy due to trade liberalization yields a trade induced child labor scale effect.
Technique Effect	Holding other factors equal a change in the income growth of an economy due to trade liberalization leads to trade induced child labor technique effect.
Selection Effects	Holding scale and technique effect constant a change in the trade intensity leads to a change in the number of domestic firms, which implies a trade induced child labor selection effect.
Total Impact of Trade	Total impact of trade on child labor depends upon the sum of the magnitude of trade induced child labor selection, scale and technique effect.

In the previous studies, i.e. Krugman (1979,80) discusses the two types of trade induced effects, namely scale and selection due to trade liberalization (Feenstra, 2003). Copeland and Taylor (2001, 2003 and 2013) use Heckscher-Ohlin framework and find three types of trade induced effects i.e. scale, technique and composition. Aralas (2010) sums up the Krugman (1979 and 1980) and Copeland and Taylor (2001 and 2003) work and concluded there are four types of trade induced effects scale, selection, technique and composition. In this section, this research checks the effect of trade intensity on the child labor by using the trade induced child labor selection, scale and technique effects on the similar grounds.



#### 4.6.2 Selection Effect

Thus, in the ongoing analysis, the trade intensity has a negative effect on the number of firms. The new theory suggests that the increase in the trade liberation shrinks the number of the firms in the locality; only the competitive firms can survive in the region other non-competitive firms have to exit from the competition. The competitive strategy is always more profitable than the exploitative strategy. Estevez (2011) concludes that child labor is an inappropriate option for producers than unskilled adult labor even after accounting for productivity differences. Therefore, the child labor in the competitive environment decreases and it is called a trade induced child labor selection effect.

The change in trade intensity on the number of firms is as given by the following:

$$n = N \left[ \alpha + \frac{\beta N q_i}{\left( \frac{w\beta}{T(\sigma-1)} \right)^{\frac{1}{\sigma}}} \right]^{-1} \quad \dots (2.1)$$

$$\frac{\partial n}{\partial T} = -N \left[ \alpha + \frac{\beta N q}{\left( \frac{w\beta}{T(\sigma-1)} \right)^{\frac{1}{\sigma}}} \right]^{-2} \left[ \frac{\beta N q}{\sigma} \left( \left( \frac{w\beta}{T(\sigma-1)} \right)^{-\left( \frac{1+\sigma}{\sigma} \right)} \right) \frac{w\beta}{T^2(\sigma-1)} \right] \quad \dots (2.2)$$

$$\frac{\partial n}{\partial T} = -N \left[ \alpha + \frac{\beta N q}{cl^{\frac{1}{\sigma}}} \right]^{-2} \left[ \frac{\beta N q}{\sigma} \left( (cl)^{-\left( \frac{1+\sigma}{\sigma} \right)} \right) T^{-1}(cl) \right] < 0 \quad \dots (2.3)$$

Dividing equation (2.3) by (1.3)

$$\frac{\frac{\partial n}{\partial T}}{\frac{\partial cl}{\partial T}} = \frac{-N \left[ \alpha + \frac{\beta N q}{cl^{\frac{1}{\sigma}}} \right]^{-2} \left[ \frac{\beta N q}{\sigma} \left( (cl)^{-\left(\frac{1+\sigma}{\sigma}\right)} \right) T^{-1}(cl) \right]}{-T^{-2}(cl)}$$

$$\frac{\partial cl}{\partial n} = N \left[ \alpha + \frac{\beta N q}{cl^{\frac{1}{\sigma}}} \right]^2 \left[ \frac{\beta N q}{\sigma} \left( (cl)^{\left(\frac{1+\sigma}{\sigma}\right)} \right) T^{-1} \right] \dots (2.4)$$

$$\frac{\partial cl}{\partial n} > 0 \dots (2.5)$$

#### 4.6.3 Scale Effect

It typically remains the truism that the trade increases scale of the economy and leads to an increase in the number of products produced, or an increase in the scale of production (Francois, 1990).

$$x = (1 - \hat{A})^{-1} Nq \dots (3.1)$$

$$x = \left( 1 - \left( 1 - \left( \frac{w\beta}{T(\sigma-1)} \right)^{\frac{1}{\sigma}} \right) \right)^{-1} Nq \dots (3.2)$$

$$\frac{\partial x}{\partial T} = \frac{Nq}{T\sigma} (1 - \hat{A}) (cl)^{\frac{2-\sigma}{\sigma}} \dots (3.3)$$

$$\frac{\partial x}{\partial T} > 0$$

Equation 3.3 shows the trade openness increases the scale of production in the economy. The increase in scale of production due to trade brings income in the country and this is source of better technique of production in the economy.

$$\zeta l = \dot{A} . x \dots (3.4) \quad (\text{see, Apendex A})$$

$$\frac{\partial cl}{\partial x} = \dot{A} \dots (3.5)$$

Equation 3.5 shows that increase in scale of production is positively associated with child labor. The silver lining of this result is a source of improvement in the production techniques of an economy.

#### ***4.6.4 Technique Effect***

Theoretically, an increase in the trade intensity brings a positive change in the income level of the nation and has a direct effect on the performance and techniques of the production. These techniques excel the skills of the labor in the trading countries. This analysis hypothesized that trade induced technique effect in the trading economy positively affects the amelioration. The amelioration is basically improvement in the labor standard; it means skilled, educated and adult labor is demanded for the production purpose in this framework. Child labor is supposed unskilled, uneducated and low productive labor in this analysis. The increase in the amelioration means the decrease in the child labor. Thus, the trade liberalization increases the marginal benefit of reducing child labor.

The effect of a change in the trade intensity to the level of amelioration can be shown as follows:

$$\mathring{A} = 1 - \left( \frac{w\beta}{T(\sigma-1)} \right)^{\frac{1}{\sigma}} \quad \dots (4.1)$$

$$\frac{\partial \mathring{A}}{\partial T} = \frac{(T^{-2})}{\sigma} \left( \frac{w\beta}{T(\sigma-1)} \right)^{\left(\frac{1}{\sigma}-1\right)} \left( \frac{w\beta}{\sigma-1} \right) > 0 \quad \dots (4.2)$$

$$\frac{\partial \mathring{A}}{\partial T} = \left( \frac{T}{\sigma} \right) (cl)^{\left(\frac{1}{\sigma}-1\right)} (cl)^1 > 0 \quad \dots (4.3)$$

$$\frac{\partial \mathring{A}}{\partial T} = \left( \frac{T}{\sigma} \right) (cl)^{\left(\frac{1}{\sigma}\right)} > 0 \quad \dots (4.4)$$

Dividing equation (4.4) by (1.3)

$$\frac{\frac{\partial \mathring{A}}{\partial T}}{\frac{\partial cl}{\partial T}} = \frac{\left( \frac{T}{\sigma} \right) (cl)^{\left(\frac{1}{\sigma}\right)}}{-T^{-2}(cl)}$$

$$\frac{\partial \mathring{A}}{\partial cl} = - \left( \frac{T^3}{\sigma} \right) (cl)^{\left(\frac{1-\sigma}{\sigma}\right)}$$

$$\frac{\partial cl}{\partial \mathring{A}} = \frac{-\sigma}{T^3(cl)^{\left(\frac{1-\sigma}{\sigma}\right)}}$$

$$\frac{\partial cl}{\partial \hat{A}} < 0$$

The result shows that trade positively affects the amelioration or technique effect, while effect is negatively associated with child labor. However, at this point it's worth considering that the increase in labor standards or amelioration means a decrease in the child labor, in other words, it can be stated that trade induced child labor technique effect is negative as this research hypothesized earlier. The increase in trade intensity necessitates the firm to increase the allocation of output for labor amelioration and reduce the child labor.

#### **4.7 The Estimation Model of Trade of Differentiated Products**

In this section, this research expands the disintegration of the child labor effects of trade of differentiated products to examine the link between child labor and economic factors that define the trade of differentiated products. This analysis shows how the theoretical anisotropy in chapter four transformed into estimating equations for empirical analysis. The estimating equation will describes the trade effects on number of firms (differentiated products) intimated in the earlier section. SAARC and ASEAN countries in the sample are assumed to engage in the trade of both differentiated and homogeneous products with trading partners. This is one of the unique contribution to show the effects of trade on child labor empirically, by using trade induced effects. To achieve an empirical equation, the theoretical relationship needs to be transformed that can be estimated.

#### ***4.7.1 Explanation of Variables***

There is no consistent measure, interpretation of the lawful age and working conditions of child labor across the countries. Two primitive categories are usually recognized in the child labor studies (i) economic activities and (ii) hazardous work. Child labor activity is inherently more difficult to measure than simple labor activity. Sometime, it rules out the necessary chores that children undertake as household member subject to important seasonal variations (Anker, 2000). According to the international definition of employment, the child labor can be identified as economically active children if they work for at least one hour in a reference week<sup>20</sup>. Thus, child labor in this research is a substantial as promulgated by the ILO and world development indicators, which is based on the agency's Minimum Age Convention No 138 (1973). Child labor  $\zeta l_{it}$  is surprisingly difficult to define, this dissertation establishes a normal definition and considered children under the age of 14, engage in economic activity directly in all sectors of the economy or school going children in employment, are part of child labor. This thesis takes children in employment percentage of children ages 5-14 as child labor based on available data base. This analysis looks at child labor in 9 SAARC and ASEAN countries and tests the robustness for the choice years 1999 to 2013. The intertemporal variations in child labor data<sup>21</sup>

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<sup>20</sup> The calendar week containing the 12<sup>th</sup> day of the month, which is used in the current population survey as the time period for documenting the employment and labor force status of respondents.

<sup>21</sup> Most of countries have some independent observations for a given years. Some observations are taken by imputation rather than actual variation in child labor due to infrequent surveys, generally, for SAARC countries. For controlling the time invariant country characteristics a panel data is recommended by this study.

are driven by imputation<sup>22</sup> and some adjustments based on country wise household surveys at national level. Data adjustment is made to make the data comparable because data of all countries are not available for the same year.

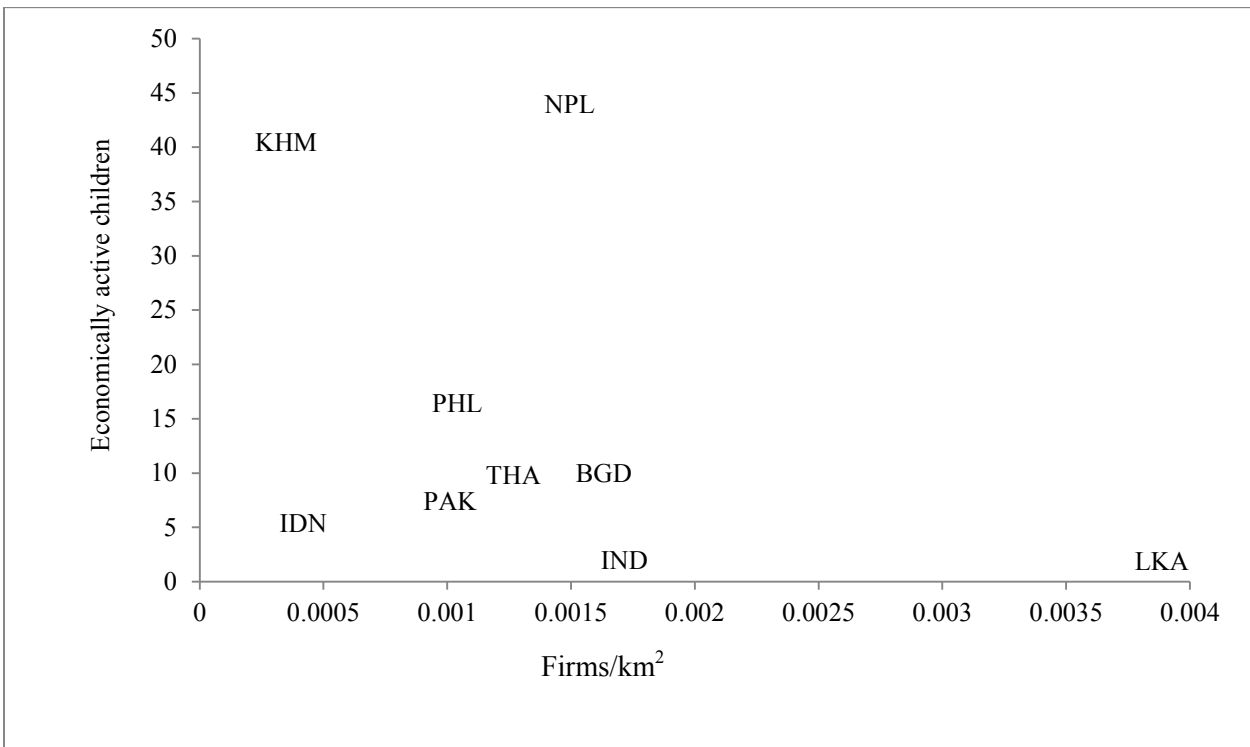


Figure 8: Child Labor and Firms Density

Source: UNICEF (2012) and World Development Indicators (2012).

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<sup>22</sup> The missing data were imputed with the average of the observations in countries of the same region. Then the regional average is combined with the information available from the country to compute the child labor status (Pasteels, 2013).

In the theory, the differentiated products derive from the variation in the number of firms engaged in the production of differentiated goods or in the number of product varieties (Startz, 1989 and Feenstra, 2003). Along these lines, in the data, the differentiated product can be characterized by two measures: one, by the change in the number of domestic firms, and two, by the change in the number of product varieties produced domestically (Feenstra, 2003). Krugman (1979) talks about the preference of variety based on selection of variety (differentiated products). This is the same concept as explained by Feenstra (2003). Thus, in the data, the selection effect can be represented by two measures: one, by the change in the product varieties produced domestically, and two, by the change in the number of domestic firms. In current analysis change in the preference of variety is explained by number of firms. Consistent with other measure, the measure of the number of firms is in intensive form and it is number of listed domestic companies per squared kilometer (companies/km<sup>2</sup>).

Domestically incorporated companies in the country's stock market are used as a proxy for a number of firms.  $SEL_{it}$  is used to show the effect of change in number of firms on child labor. This effect is due to a change in the number of firms in the economy on the basis of selection of product variety.  $SEL_{it}$  includes all kinds of companies, which are engaged in production of goods. The theory suggests that in general, the number of firms is directly associated with labor demand (Brainard and Riker, 1997; Fehr et al., 1998 and Felbermayr and Prat, 2011), similarly, child labor is directly associated with the demand for labor (Humphries, 2010). Figure 8 presents the graphical observation of raw data to support the understanding of selection effect with respect to child labor.



In our empirical model  $SEL_{it}$  is associated with the country-specific number of listed companies. Thus, the child labor and trade model suggests a definition of product variety which can be best defined by firm-level production that is the number of firms engaged in production of differentiated products. Accordingly, this research uses the number of listed domestic companies to represent the selection effect, sourced from the World Development Indicators (WDI) for the years 1999-2013.

**Table 10: Variable Explanation and Measurement**

	<b>Explanation</b>	<b>Proxy</b>	<b>Variable Measurement</b>
Selection effect	Change in the number of product varieties	Product Price	-
	Change in the number of firms	Listed companies in stock markets	Companies/km <sup>2</sup>
Scale effect	Industrial production	Industrial production index	-
	Size of economy	GDP	GDP/km <sup>2</sup>
Technique effect	Change in techniques of production	FDI	-
	Change income level	GNP or NFFI	NFFI/Population
	Capital intensity	K/L	-
Trade openness	Trade barriers	Custom duties	-
	Trade shares	Trade intensity	(X+M) /GDP
	Trade volumes	X+M	-
	Net exports	X-M	-

A further concern identifies the rationale and visualization of the scale and technique effects in the data. The data used for scale effect can be minimal or extensive depending on the

level of accuracy and should complement with the aggregate effects of the change in child labor that is due to both of homogeneous goods and differentiated goods. To simplify the discussion in this document, it is anticipated from Mukhopadhyay and Chakraborty (2005) and Copeland and Taylor (2001) that, the scale and technique effects as represented by gross domestic product (GDP) and gross national product (GNP), respectively, measure the effect of trade. It is worth noting at this stage trade consists of both homogeneous and differentiated products.

For this study, it might be important to discuss the problem associated with the gross domestic product (GDP) which is used to show the scale effect. GDP explicate the variation in the scale of production due to a change in the supply of both differentiated and homogeneous goods, it is prudent to assume that the child labor scale effect illustrated by the change in gross domestic product is the aggregate effect of the changes from both the production of homogeneous and differentiated goods. The scale effect in this study is GDP per kilometer squared, because there are notable cross country differences in the GDPs of SAARC and ASEAN countries that can avoid the pragmatic approach to evaluate the impact of scale effect. Graphical presentation of raw data for this variable in Figure 9 shows an association of scale effect and child labor.

However, a similar reasoning strategy in this context can be applied to the technique effect, conveniently, the income effect measured the change in child labor due to changes in income or gross national income. More precisely, the technique effect is the improvement in child labor as firms undertake the amelioration of labor to meet labor regulation standards, so,

the higher the income level the more stringent child labor regulation will be. Thus the change in child labor can be represented by the change in the technique of production (see Karlan and Valdivia, 2011) where an increase in income level is associated with a decrease in child labor.

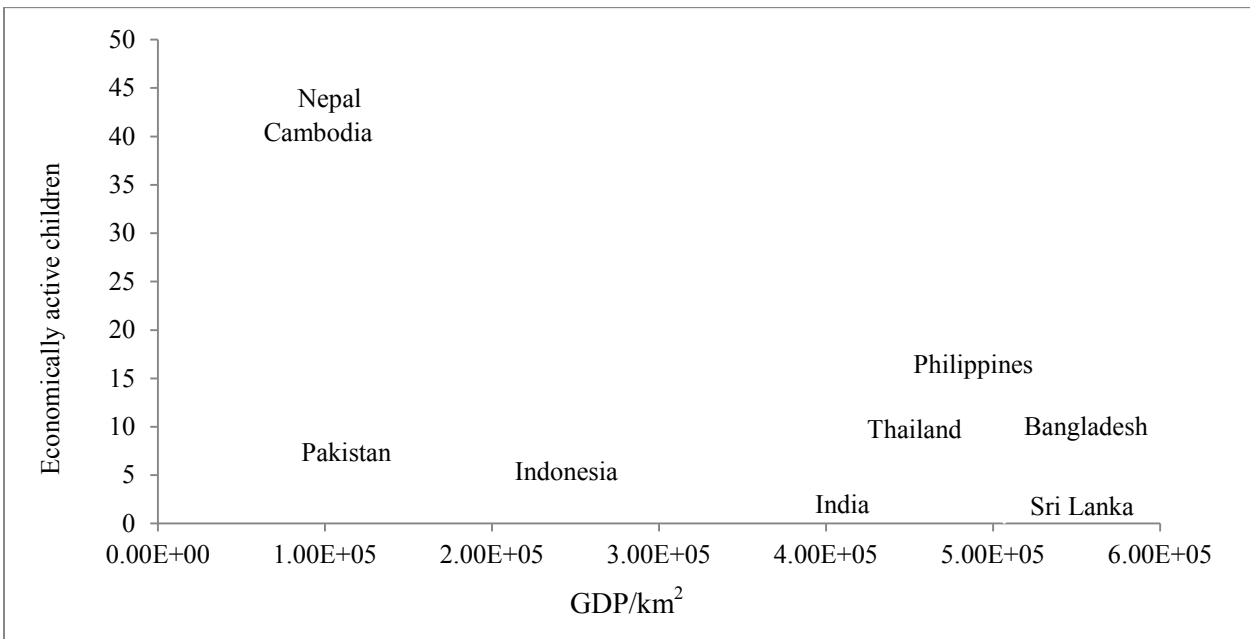


Figure 9: Child Labor and Scale of Production

Source: UNICEF (2012) and World Development Indicators (2012).

In the presence of GDP, the GNP is the source of high correlation among these variable. This study takes the difference of GDP and GNP which is net foreign factor income (NFFI). In simple word it is the difference between payment given to home country labor from foreign people and payment given to foreign country labor from home country people. This technique is more appropriate in the Krugman framework, because in this framework key factor of

production is labor. In this way a country which has more skilled labor, will take more income from foreign countries or in other words more skilled labor will use better technique.

#### ***4.7.2 Child Labor Effects in the Closed Economy***

The empirical evidence of child labor in the close economy is essential to the debate on the performance of different effects. Model-A shows that the change or growth in total child labor can be decomposed into, or is the sum of, the scale, selection and technique effect (respectively). The model can be quite easily solved numerically for a variety of parameter values. It is possible to proceed entirely numerically from this point. If we take a somewhat different approach, however, it is possible to characterize the properties of the model analytically. Model-A allows to express the demand of child labor in an autarky situation with respect to time ( $t$ ) across the countries.

$$\varsigma l_{it} = \alpha_0 + \beta_1 SCL_{it} + \beta_2 SEL_{it} + \beta_3 TEC_{it} + u_{it} \dots (A)$$

#### ***4.7.3 Child Labor Effects in the Open Economy***

Model-A does not express the effect of trade liberalization, so this study introduces a trade variable.  $TR_{it}$  is used to examine the effect of overall trade on the level of child labor.  $TR_{it}$  is defined as the openness of trade in term of trade intensity and calculated as the import plus export ratio to GDP  $\left(\frac{(X+M)}{GDP}\right)_{it}$ .

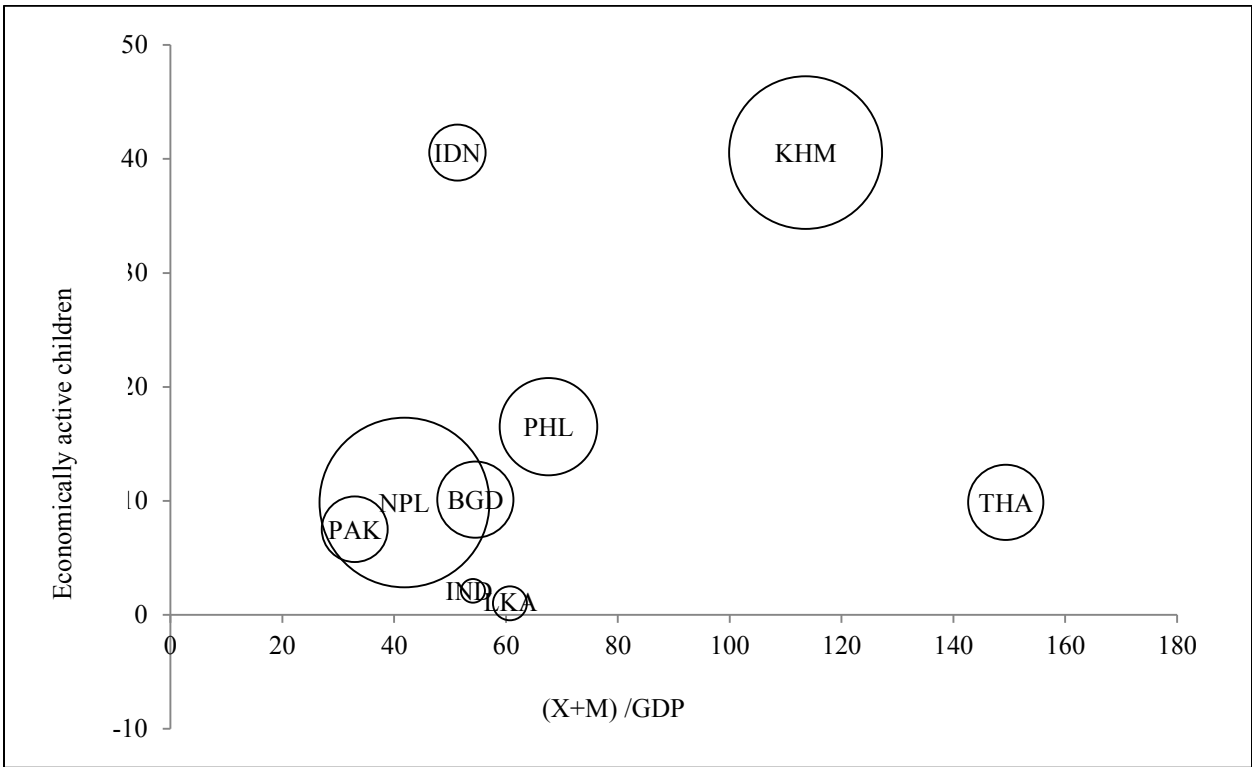


Figure 10: Child Labor and Trade Openness

Source: UNICEF (2012) and World Development Indicators (2012).

Trade intensity is thus the share of total trade in the GDP. The greater the share of trade in the GDP the greater will be trade intensity of a country and thus more open will be the economy to foreign competition. Use of trade intensity is very common in the literature, Fung and Maechler (2007) and Alam et al. (2011) and Copeland and Taylor (2001) utilize this variable to express the trade liberalization. Following this tradition, the current exploration also include this variable in the model. The graphical observation of raw data supports the understanding of trade openness and child labor in Figure 10.

In the current exploration, the trade intensity is exercised to measure two kinds of effects. Firstly, it establishes the link between trade liberalization and child labor. Secondly, it is to explained in interaction forms to express the responses trade induced selection effect, scale, and technique effects. So, Model-A can be rewritten as:

$$\varsigma l_{it} = \alpha_0 + \beta_1 SCL_{it} + \beta_2 SEL_{it} + \beta_3 TEC_{it} + \beta_4 TR_{it} + u_{it} \dots (B)$$

#### ***4.7.4 Trade-Induced Child Labor Effects***

Model-B only shows the effect of selection of product variety, scale of production, technique of production and trade on the child labor. To derive trade related child labor effects, an interaction term  $TR_{it}$  can be introduced along with the variables representing the scale of production, technique of production, and number of firms represent the trade-induced child labor scale, technique and selection effects.

Adding an interaction term to Model C drastically changes the interpretation of all of the coefficients of selection, scale and technique effect variables in Model A. It is now interpreted as the unique effect of selection, scale and technique effects on child labor only when trade = 0. But the interaction means that the effect of these variables on child labor is different for different values of trade. So, the unique effect of selection, scale and technique effects on child labor is not limited, but also depends on the values of trade-interacted variables (trade induced child labor effects).

Following is the linear model that can be used to examine the trade-induced child labor effects:

$$\varsigma l_{it} = \alpha_0 + \beta_1 SELTR_{it} + \beta_2 SCATR_{it} + \beta_3 TECTR_{it} + u_{it} \dots (C)$$

Where,  $SELTR_{it}$  variable shows the change that trade brings about in a number of firms. Trade creates a fall in the number of firms due to economies-of-scale internal to the firms. This is because economies of scale make it valuable for a country to specialize in the production of only a limited range of products. The effect of a change in the number of firms on the level of child labor as a result of the change in trade intensity is called trade-induced child labor selection effect. In our empirical specification domestic companies per squared kilometer along with the openness of trade is trade-induced child labor selection effect  $(SELTR)_{it}$ .

$SCLTR_{it}$  variable shows that change in the trade intensity brings a change in scale of production. The effect of the change in scale of production at the level of child labor due to a change in trade intensity is called trade-induced child labor scale effect. In our empirical specification  $SCLTR_{it}$  is the  $i_{th}$  country's gross domestic product per squared kilometer interacted with trade intensity (this is trade-induced child labor scale effect) at time  $t$ .

NFFI is used to determine the child labor technique effect. To find the trade-induced child labor technique effect, we interact the net foreign factor income (NFFI) per capita with trade intensity  $(TECTR)_{it}$ . Copeland and Taylor (2001) use this trade-induced technique effect

in their work on trade and environment. Trade-induced child labor technique effect shows the effect of change in the income level on the level of child labor.

#### **4.8 Measurement and Data Sources**

The dependent variable, child labor, is the proportion of 5 to 14 year old children involved in economic activity that exists generally in developing economies. Using multiple imputations to adjust for missing values for child labor data, collected from various sources<sup>23</sup>. Data on gross domestic product, gross national product in 2000 dollars and other macroeconomic variables is sourced from the world development indicators, for the years 1999-2013.

Gross domestic product measures the scale effect induced by a change in size of the economy. In order to avoid strong correlation between GNP and GDP, the difference between the GNP and GDP will be used to disconnect the income effect from the scale effect. The new explanation of technique effect is measured as net foreign factor income ( $NFFI = GNP - GDP$ ) or the net amount of nation earned in a fiscal year. Domestically incorporated companies in the country's stock market are used as a proxy for a number of firms. Consistent with other

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<sup>23</sup> Data is gathered by the access to specific databases, i.e. ILO (IPEC reports), The United Nations Children's Fund (UNICEF), Understanding Children's Work (UCW), Department of Census & Statistics from different countries and World Development Indicators etc. A comprehensive internet searches and e-mails to key informants are also made to collect the related child labor data.



measure, the measure of the number of firms is in intensive form and it is number of listed domestic companies per squared kilometer (companies/km<sup>2</sup>).

**Table 11: Variable Description**

Dependent Variable		
Variable Name	Variable Code	Variable Explanation
Child Labor	$\varsigma_{it}$	Percentage of children (aged 5-14) engaged in child labor
Data Source	Various Sources	
Independent Variables		
Variable Name	Variable Code	Variable Explanation
Selection Effect	$SEL_{it}$	Country specific number of listed companies per squared kilometer.
Scale Effect	$SCL_{it}$	Gross Domestic Product (GDP) per squared kilometer
Technique Effect	$TEC_{it}$	Net foreign factor income (NFFI) per capita
Trade	$TR_{it}$	Import plus export ratio to GDP
Trade Induced Technique Effect	$TECTR_{it}$	Technique Effect interacted with the openness of trade
Trade Induced Selection Effect	$SELTR_{it}$	Selection Effect interacted with the openness of trade
Trade Induced Scale Effect	$SCLTR_{it}$	Scale Effect interacted with the openness of trade

Note: Data for independent variables is derived from World Development Indicators

Openness of trade<sup>24</sup> in term of trade intensity ( $TR_{it}$ ) is calculated as the import plus export ratio to GDP  $\left(\frac{X+M}{GDP}\right)_{it}$ . Trade intensity is thus the share of total trade in the GDP. Alam et al. (2011) and Tariq and Ab-Rahim (2016) utilize this variable to express the trade liberalization. Following this tradition, the current exploration also includes this variable in the model. The effect of a change in the number of firms on the level of child labor as a result of the change in trade intensity is called trade-induced child labor selection effect. In this study domestic company per squared kilometer along with the openness of trade is used to express the trade-induced child labor selection effect ( $SELTR$ )<sub>it</sub>. While, the effect of the change in scale of production on child labor due to a change in trade intensity is trade-induced child labor scale effect. This study interacts the trade intensity with the country's gross domestic product per squared kilometer to show the trade-induced child labor scale effect at time  $t$ . Finally, to find the trade-induced child labor technique effect, this study interacts the net foreign factor income (NFFI) per capita with trade intensity ( $TECTR$ )<sub>it</sub>. Copeland and Taylor (2001) use this trade-induced technique effect in their work on trade and environment. Trade-induced child labor technique effect shows the effect of change in the income level on the level of child labor.

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<sup>24</sup> It is difficult to segregate X+M into different sectors or infer a transition in trade sectors from the evolution of the sector selection probability. A change in the sector selection probabilities may indicate that a transition in trade patterns. Observations on trade flows are not likely to fit well with a specified regression equation that is constant over the observation period. A switching regression model is not appropriate for Krugman (1979) framework, the transition in trade patterns in which a shifting from comparative advantage to product differentiation occurs. Infrequent surveys and data constraints also make this study specific to simple definition of trade openness. Literature on trade and child labor also support this proxy (see also, Doytch et al., 2013; Estevez, 2011; Davies and Voy, 2009 ; Neumayer and De Soysa, 2005)

The empirical investigation within given epistemological domains relies on the findings resulted from theoretical contribution which was conducted previously, in the following ways. First a unique empirical model articulates the discernible effects of trade for SAARC and ASEAN countries which are engaged in production and trade of homogeneous and differentiated goods. Second, the data in the gross domestic product and gross national product can be pursued for both homogeneous and differentiated products effects. Furthermore, this study deciphers the estimates of scale effects (by using gross domestic product) and technique effect (by using net foreign factor income) as estimates that shows the integrated child labor effects of an economy and these effects exist in the production and trade of homogeneous and differentiated products.

#### **4.9 Method**

The analysis is carried out using panel data models, for getting a more accurate measurement of whether child labor has curtailed over the period 1999 to 2013 in selected ASEAN and major SAARC countries. Panel data give an increased precision estimation by accreting time periods of data for each individual. For all that, a valid statistical inference can only be achieved by controlling correlation of regression model errors over time period for a given entity or individual.

Many early studies of trade and child labor, relied solely on cross-sectional data due to limitation of data, however, the most recent databases of the International Labor Organization

(ILO), International Program on the Elimination of Child Labor (IPEC), The United Nations International Children's Emergency Fund (UNICEF), World Development Indicators (WDI) and Understanding Children's Work (UCW) has enough information for child labor, therefore the trend is now altering and the stream of studies is rotating around panel data methods. The panel data allow the dynamics of individual country behavior as compared to cross section assortment at one specific point in time. While simultaneously, panel data analysis allows consistent estimates for fixed effect model, in conjunction with consistency, unobserved country specific heterogeneity, which sometime correlated with regressors, can be resolved in a fixed effects model. However, contrary to this expectation, if unobserved country specific effects are assumed to be distributed randomly of regressors, random effects model implies additional orthogonality.

In order to ensure a valid statistical inference, the panel-robust statistical inferences are corrected for both the correlation of errors over time for major SAARC and selected ASEAN countries and heteroskedasticity across these countries. The Hausman specification test and Sargan-Hansen test<sup>25</sup> is used to check whether fixed or random effects model is more appropriate.

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<sup>25</sup> Sargan-Hansen test is an extension of Hausman test, with cluster robust version to robust to heteroskedasticity and within group correlation (Schaer and Stillman, 2010)

**Table 12: Panel Data Models with a Small Number of Countries.**

<b>Static Models</b>	
Fixed effects (FE)	The fixed-effects model controls for all time-invariant differences between the individuals, so the estimated coefficients of the fixed-effects models cannot be biased because of omitted time-invariant characteristics.
Random Effects (RE)	The random effects model is used when some omitted variables are constant over time, but vary between counties, and others may be fixed between countries but vary over time. RE estimator is a weighted average of fixed and between effects.
<b>Fixed-Effect Versus Random-Effects Models</b>	
The Hausman test checks a more efficient model against a less efficient but consistent model to make sure that the more efficient model also gives consistent results.	
<b>Dynamic Models</b>	
Mean Group (MG)	Mean Group estimator (MG) which is based on estimating N time-series regressions and averaging the coefficients (Pesaran and Smith, 1995). It consists of estimating separate regressions for each country and computing averages of the country-specific coefficients, which will provide consistent estimates of the long-run coefficients. The least restrictive procedure and it allows for heterogeneity of all the parameters (imposes no cross-country restriction). Does not take account of the fact that certain parameters may be the same across groups.
Dynamic Fixed Effect (DFE)	Dynamic Fixed Effect imposes homogeneity of all slope coefficients, allowing only the intercepts to vary across countries
Pooled Mean Group (PMG) <sup>26</sup>	PMG estimator which is a combination of pooling and averaging of coefficients (Pesaran et al., 1999). Intermediate estimator (between DFE and MG). Allows the intercepts, short-run coefficients and error variances to differ freely across groups, but constrains the long-run coefficients to be similar across groups.

Note: This study is based on static models, to present a comparative statics analysis of the effects of an increase in the trade intensity which generates trade-induced scale, technique and selection effects.

Source: Hsiao (2014)

<sup>26</sup> A basic requirement of the PMG estimator is that  $T$  should be large (Pearson, Shin and Smith 1998). Using Monte Carlo experiment, it can be shown that the Mean Group (MG) estimator is consistent but it is unlikely to be a good estimator when either  $N$  or  $T$  is small (Pearson, Shin and Smith 1998). Since the basic assumption of the PMG estimator has been violated, hence the results cease to be reliable (Hsiao et al., 1998).

#### 4.10 Unobservable Variables

Unobservable parameters such as the exogenous demographic attributes, labor market attachments, education system and child labor preference in the production process (as a compliment or substitute) can be considered as time invariant country specific effects represented by the unobserved heterogeneity, denoted as  $\varepsilon_i$ .

It is also noted that common-to-all-countries effects such as relative income idiosyncrasies and unconventionalities in amelioration process and dynamic technological improvements, may be considered as time-specific effects, denoted as  $\mathfrak{I}_t$ . Machine error in reading child labor concentrations and human error in the calculation is a source of idiosyncratic error represented by  $\mu_{it}$ . To expound the unobserables and individual effects of the model are specified in the following way:

$$u_{it} = \varepsilon_i + \mathfrak{I}_t + v_{it}$$

$\mathfrak{I}_t$  is a time-specific effect,  $\varepsilon_i$  is a country specific effect, and  $v_{it}$  idiosyncratic measurement error for country at time. The most familiar fixed effects and random effects panel data treatments for count data are suggested by Hausman et al (1984). An alternative of Hausman test is the Sargan-Hansen test (Schaffer and Stillman, 2011), the Sargan Hansen test is

used cluster-robust standard error as it allows the determination of the most appropriate estimator between the fixed and random effects models.

If country-specific effects contained in the unobserved random component, which may be a case of many practical applications in international economics, are correlated with predictors, then fixed effects estimator allows for consistent estimation of the model. In contrast to the fixed effects model, sometime the unobserved country-specific heterogeneity is distributed randomly of the predictors, in this case, consistent and efficient estimation contingent upon the model of the random effects estimator. Note that the pooled ordinary least squares (OLS) estimator is inconsistent if the true model is the fixed effect model. Pooled ordinary least squares (OLS) estimator is inconsistent, while the pooled OLS is consistent but less efficient where the random effects model is more appropriate.

## **CHAPTER 5**

### **EMPIRICAL RESULTS**

#### **5.1 Chapter Overview**

This chapter is a presentation of empirical results, which evaluates the prospective of trade induced effects on child labor in the SAARC and ASEAN countries. Estimating equations, based on the predictions of the theoretical framework refers to the previous chapter, explain the various effects of trade. This chapter consists of descriptive statistics, discussion of empirical results and alternative specifications for SAARC and ASEAN countries.

#### **5.2 Descriptive Statistics**

The descriptive statistics of the variables employed are reported in Table 13. Total number of observations used in the empirical analysis, means, standard deviation, minimum and maximum values of variables provide a useful information of child labor and other explanatory variables. The summary statistics of the variables contains the data from 9 SAARC and ASEAN countries<sup>27</sup>. The data consists of 15 years (1999 to 2013) with a total number of 135 observations.

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<sup>27</sup> Major SAARC countries, namely, Bangladesh, India, Pakistan, Nepal, and Sri Lanka and selected ASEAN countries, namely, Cambodia, Indonesia, Philippine, and Thailand.



**Table 13: Descriptive Statistics of Variables**

Variable Name	Variable Code	Mean	Max	Min	Std. Dev.
Child Labor	$\varsigma l_{it}$	15.91	52.3	1.47	14.47
Selection Effect	$SEL_{it}$	$1.21e^{-03}$	$4.37e^{-03}$	$7.18e^{-05}$	$1.04e^{-03}$
Scale Effect	$SCL_{it}$	$3.66e^{+03}$	$8.73e^{+03}$	$7.53e^{+02}$	$1.71e^{+05}$
Technique Effect	$TEC_{it}$	67.97	178.62	0.26	24.87
Trade	$TR_{it}$	70.45	150.32	25.54	36.76
Trade Induced Technique Effect	$TECTR_{it}$	$2.36e^{+03}$	$6.44e^{+03}$	$2.14e^{+02}$	$1.61e^{+03}$
Trade Induced Selection Effect	$SELTR_{it}$	$1.26e^{+02}$	$7.07e^{+02}$	$8.22e^{+01}$	$1.59e^{+02}$
Trade Induced Scale Effect	$SCLTR_{it}$	$2.46e^{+05}$	$6.64e^{+05}$	$2.04e^{+04}$	$1.71e^{+05}$
Unemployment	$UNEP_{it}$	4.78	11.9	0.2	2.89
Literacy rate	$EDU_{it}$	71.32	97.23	32.57	20.27

**Note:** Literacy rate measures the percentages of the population, age 15 and above, who can read and write. The unemployment comprise all labor force that is without work but available for and seeking employment.

Based on Table 13, the selection effect (number of listed companies/km<sup>2</sup>) varies from  $7.18e^{-05}$  points to  $4.37e^{-03}$  points, while the technique effect (NFFI per capita) varies from 0.26 points to 178.62 points and the scale of the countries (GDP/km<sup>2</sup>) varies from a low of 753 to a high of 8730 with a mean of 3660. The explanatory variable trade changes between 25.54 percent to 150.32 percent with a mean of 70.45 percent which implies that some economies are more open to trade than others, the trade induced selection effect variable has a minimum of 82.2 and a maximum of 707 with a mean of 1260, while the average of trade induced scale and

technique effects are 246000 and 2360 respectively. The mean of unemployment and literacy rate indices are 4.78 percent and 71.32 percent, respectively.

### **5.3 Empirical Results**

The estimation procedure of this research consists of five steps. In the first step, an exposure assessment of the simple model by capturing selection, scale and technique effects obtained for the child labor in SAARC and ASEAN respectively in closed economy case. In the second step, a variable of trade combined with selection, scale and technique effects variables in both regions to find the effect of change in trade on child labor. Next, in the third step, the synergies of both SAARC and the ASEAN countries examine the selection, scale and technique effects with trade intensity to provide a preliminary assessment of how trade affects the child labor. Subsequently, the fourth step presents trade interactions to check the trade induced effects across the SAARC and ASEAN countries. As the theoretical framework suggests that the trade induced effects are the key determinants of child labor. Finally, a number of other explanatory variables added to the closed economy and open economy models to investigate the relationship between these variable and child labor in SAARC and ASEAN countries.

### ***5.3.1 Estimation Results for Model A and Model B***

This regression for ASEAN countries is based on 60 observations. A low  $R^2$  of models A and B have low predictive value under these circumstances in theory for ASEAN countries. While the regression for SAARC countries is based on 75 observations. While the regression in a set of SAARC plus ASEAN countries is based on 135 observations, the significant improvements are witnessed in  $R^2$  for Models A (0.295) and B (0.298), it shows that a sufficient amount of variation is explained by Model A and Model B.

Table 14 presents initial estimates of selection, scale and technique effects with the help of Model A for autarky and Model B for open economy. In calculating the selection, scale and technique effects with child labor it is assumed that the relative position of selected ASEAN and major SAARC countries in the world remains constant between 1999 to 2013. Consistency across the regressions in the sign of the estimated coefficients reported in the majority of variables for both SAARC and ASEAN countries and t-values reflect the relevance of these variable.

Table 14 indicates that there is a negative; however it is statistically insignificant relationship between child labor and selection effect for SAARC countries and for ASEAN countries, while a statistically significant relationship is found in a set of ASEAN plus SAARC countries for a closed economy (Model A). Furthermore, the results for open economy (Model B) indicates that there is a negative and statistically significant relationship exists between child

labor and selection effect for SAARC countries, for ASEAN countries and in a set of ASEAN plus SAARC countries.

**Table 14: Estimation Results for Model A and Model B**

Dependent Variable: Child Labor						
	Model A			Model B		
	ASEAN	SAARC	SAARC&ASEAN	ASEAN	SAARC	SAARC&ASEAN
SEL	-0.025 (-1.34)	-0.002 (-1.03)	-0.007*** (-3.21)	-0.036* (-1.88)	-0.007*** (-8.68)	-0.0197* (-1.69)
TEC	-0.004 (-0.75)	-0.001*** (-2.90)	-0.0008* (-1.79)	0.010 (0.54)	-0.005*** (-8.28)	0.0001* (1.75)
SCL	0.010*** (4.01)	0.0039*** (5.65)	0.0062*** (7.56)	0.10*** (6.19)	0.008*** (8.30)	-0.0004*** (-3.33)
TRADE	-	-	-	0.108** (1.97)	0.510*** (4.91)	0.013 (0.26)
Hausman Test	33.16 (0.00)	0.73 (0.000)	6.96 (0.073)	32.89 (0.000)	65.01 (0.000)	3.911 (0.418)
Observations	60	75	135	60	75	135
R <sup>2</sup> - overall	0.043	0.280	0.295	0.009	0.287	0.298
*** indicating significance at 1-percent						
** indicating significance at 5-percent						
* indicating significance at 10-percent						
SEL: Country specific number of listed companies per squared kilometer.						
TEC: Net foreign factor income (NFFI) per capita						
SCL: Gross domestic product (GDP) per squared kilometer						
TRADE: Import plus export ratio to GDP						
Note: $\varsigma l_{it} = \alpha_0 + \beta_1 SEL_{it} + \beta_2 SCL_{it} + \beta_3 TEC_{it} + u_{it} \dots$ Model A						
$\varsigma l_{it} = \alpha_0 + \beta_1 SEL_{it} + \beta_2 SCL_{it} + \beta_3 TEC_{it} + \beta_4 Trade_{it} + u_{it} \dots$ Model B						

An insignificant negative relationship between child labor and technique effect is found for ASEAN countries, while there is a negative and statistically significant relationship exists for SAARC countries and in a set of ASEAN plus SAARC countries in Model A. Further investigation reveals that child labor in SAARC countries is less responsive to technique effect as compared to ASEAN countries and empirical evidence shows an insignificant relevance of predictor and dependent variable for ASEAN countries. The linear interaction term of trade induced technique effect is positive in the set of both SAARC and ASEAN countries.

The estimates for Model A indicate that a one unit increase in the scale effect variable raises child labor by about 1% in ASEAN, 0.32% in SAARC and 0.62% in the composition of SAARC and ASEAN countries, by keeping other effects constant. Whereas, the estimates for Model B indicate that a one unit increase in the scale effect variable raises child labor by about 1% in ASEAN, 0.8% in SAARC and 0.04% in the composition of SAARC and ASEAN countries, by holding all other things equal.

Another variable of interest which shows a positive association with child labor is trade variable, trade variable reports that an increase in the trade to GDP ratios raises the child labor. The results in Table 14 reveals that there is a positive and statistically significant association between child labor and trade openness for ASEAN countries, for SAARC countries and in a set of ASEAN plus SAARC countries. In the Model B for child labor, response to the trade variable is statistically significant at the 10 percent level of significance in a separate setting of SAARC and ASEAN countries. Whereas, the estimates of the trade variable are statistically

insignificant at the 1, 5 and 10 percent level of significance in a combine set of SAARC plus ASEAN countries. The reason of this weak relevance is that the standard error of trade induced selection effect coefficient is very large, so this statistic is unable to give a significant response.

The results of Table 14 imply a substantial evidence to suggest that the fixed effect model is more appropriate because unobserved country specific heterogeneity is associated with predictors in a separate setting of SAARC and ASEAN countries. While, in combine setting, there is a sufficient evidence to suggest that the estimates derived from random effect estimators are consistent and efficient.

### ***5.3.2 Discussion of the Results***

There are two notable features of results for Model A and Model B. One, for econometric model in Table 14, F-test statistics confirm that at the 1 percent level of significance there is sufficient evidence against the null hypothesis that difference in cross country variances is not zero in a separate setting of SAARC and ASEAN countries. These results validate the existence of country specific effect, therefore, pooled ordinary least squares (OLS) estimates are inappropriate in the analysis. Two, in Table 14, the scale, selection and technique effects are used with trade intensity variable and these trade induced variables use demeaned data by removing their sample mean with the exception of selection effect which is taken at steady state values. Consequently, the interpretations of scale and technique variables are made according to the mean value. In a broader sense, Model B explains the coefficient

estimates of scale and technique effects which are measured from the average trading country. In other words, this is a normal trading country, a country whose trade intensity is equal to sample mean value.

The selection effect term indicates a negative relationship between the number of listed companies and child labor. The paradox results of selection effect, consider that the reduction in the number of competent firms engaged in the production of differentiated goods can be a source of increase in child labor or an increase in the competent firms can be a source of reduction in child labor in both SAARC and ASEAN countries. These results are consistent for model A and B in all cases.

The theoretical model predicts that at high income levels, the countries have better techniques of production; this in turn implies the labor accumulation fall as development proceeds and finally a significant reduction in child labor. In Model A, the results presents the authentication of this prediction while in Model B, this prediction is verified only for SAARC countries. Based on models A and B of Table 14, this analysis finds a positive relationship between the scale of economic activity as measured by GDP/km<sup>2</sup> and child labor. The scale effect is consistent with a positive sign in both regions, while in model B, when it measures for both SAARC and ASEAN together, the sign is surprisingly negative; but the magnitude of this effect is very small. So, the effect of scale effect variable on child labor is positive. Hence, a positive scale effect as an increase in this scale of production have a cumulative impact on child labor as previously expected from theoretical predictions.

Relatively simple hypotheses regarding the effect of international trade on child labor investigated by adding measures of openness of trade in Table 14. Theoretical framework in this thesis establishes a negative relationship between trade and child labor, while empirical evidence shows an insignificant relevance of predictor and dependent variable. The results demonstrate that, the trade variable is not significant at conventional levels and signs are also unexpected in a set of SAARC plus ASEAN countries. These findings report that trade openness (greater global integration) may be correlated with an increase in child labor in a set of both regions, although this association is not valid at conventional levels of significance, but there appears to be a positive relationship between trade and child labor. This increasing trend in trade variable probably reflects a labor intensive production technique in major SAARC and selected ASEAN countries, which can be a source of an increase in child labor in these countries. The findings of the research indicate that the positive effect of trade on child labor phenomenon does not match with theoretical expectation. The main reason, why does the relationship change its direction and child labor enter the labor force at higher stages trade openness, is that the factors increasing child labor supply in developing countries have become more effective as a result of integration with global economy as compared to demand side factors. Busse and Wittwer (2001) and Neumayer and De Soysa (2005) provide the evidence that trade openness can be a cause of high incidence of child labor in developing countries. While the trade openness brings modest changes in the magnitude of some of the coefficients for scale and technique effects variables in Table 14. Overall the estimates, given in Table 14, offer an enough evidence for a positive association between openness and child labor.



### ***5.3.3 Estimation Results for Interacted and Non-interacted Models***

Table 15 indicates that there is a negative, but statistically insignificant relationship between child labor and selection effect for SAARC countries and for ASEAN countries, while a statistically significant relationship is found in a set of ASEAN plus SAARC countries in non-interacted form (Model A). Furthermore, the results of interacted<sup>28</sup> form model (Model C) indicates that there is a positive and statistically insignificant relationship exists between child labor and selection effect for SAARC and ASEAN countries, while a negative and statistically insignificant relationship is found in a set of ASEAN plus SAARC countries.

The results in Table 15 show that there is a negative, but statistically insignificant relationship between child labor and technique effect for ASEAN countries, while there is a negative and statistically significant relationship exists for SAARC countries and in a set of ASEAN plus SAARC countries for a non-interacted model (Model A). However, investigation from interaction terms reveals that child labor in SAARC countries is less responsive to technique effect as compared to ASEAN countries and empirical evidence shows an insignificant relevance of predictor and dependent variable for ASEAN countries. The linear interaction term of trade induced technique effect is positive in the set of SAARC plus ASEAN countries.

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<sup>28</sup> These interactions terms capture the combined effect of two variables i.e., selection and trade (trade induced child labor selection effect), scale effect and trade (trade induced child labor scale effect) and technique effect and trade (trade induced child labor selection effect), on child labor.

**Table 15: Estimation Results for Interacted and Non-interacted Models**

Dependent Variable: Child Labor						
	Model A			Model C		
	Non interacted			Interacted		
	ASEAN	SAARC	SAARC& ASEAN	ASEAN	SAARC	SAARC& ASEAN
<i>SEL</i>	-0.025 (-1.34)	-0.002 (-1.03)	-0.007*** (-3.21)	-	-	-
<i>SELTR</i>	-	-	-	0.423 (0.972)	2.29 (0.149)	-0.0174 (-0.77)
<i>TEC</i>	-0.004 (-0.75)	-0.001*** (-2.90)	-0.0008* (-1.79)	-	-	-
<i>TECTR</i>	-	-	-	-0.012 (-0.640)	-0.002*** (-6.53)	0.00005* (1.86)
<i>SCL</i>	0.010*** (4.01)	0.0039*** (5.65)	0.0062*** (7.56)	-	-	-
<i>SCLTR</i>	-	-	-	-0.0017 (-0.69)	-0.111* (-1.74)	-0.0004*** (-3.44)
Hausman Test	33.16 (0.000)	0.73 (0.000)	6.96 (0.073)	45.47 (0.000)	1.52 (0.678)	0.14 (0.86)
Observations	60	75	135	60	75	135
R <sup>2</sup> Overall	0.04	0.28	0.30	0.08	0.23	0.25

\*\*\* indicating significance at 1-percent

\*\* indicating significance at 5-percent

\* indicating significance at 10-percent

*SEL*: Country specific number of listed companies per squared kilometer.

*SELTR*: Selection Effect interacted with the openness of trade

*TEC*: Net foreign factor income (NFFI) per capita

*TECTR*: Technique Effect interacted with the openness of trade

*SCL*: Gross domestic product (GDP) per squared kilometer

*SCLTR* Scale Effect interacted with the openness of trade:

Note:  $\varsigma l_{it} = \alpha_0 + \beta_1 SEL_{it} + \beta_2 SCL_{it} + \beta_3 TEC_{it} + u_{it} \dots$  Model A

$\varsigma l_{it} = \alpha_0 + \beta_1 SELTR_{it} + \beta_2 SCLTR_{it} + \beta_3 TECTR_{it} + u_{it} \dots$  Model C

The estimates for the SAARC countries reveals that one unit change in the scale effect, brings 0.010 while this effect is 0.039 units in child labor in the ASEAN countries. Whereas, taking interaction of scale effects brings -0.111 units change with a 90% confidence interval for SAARC countries and it imply -0.001 for ASEAN countries with high standard error. In a set of SAARC plus ASEAN countries this change varies from 0.0062 to -0.0004 units for non-interacted and interacted models respectively.

#### ***5.3.4 Discussion of the Results for Interacted and Non-interacted Models***

The trade variable in previous section measures the predicted change in child labor for a 1% change in the ratio of exports plus imports to GDP. This measure indicates that a 1 percent change in the share of trade in GDP increase the child labor by 51 percent major SAARC countries and 10.8 percent in the selected ASEAN countries and 1.32 percent in both SAARC and ASEAN countries. On the other hand, the estimates in Table 15 indicate that a change in trade induced effects lowers the child labor. One possible cause for such a change is trade openness. The results may seem different in isolation as the estimates from Table 15 indicate that trade produces the trade induced effects toward child labor. For trade variable a positive sign is traced for the given sample of countries, it is also out of theoretical prediction. Although we have only a sample of countries, it seems reasonable to expect both positive and negative can be expected. As a check on theoretical explanation this thesis examined each country's trade intensity data, surprisingly, both child labor and share of trade in GDP are declining in most of countries of theses regions and due to this reason trade estimates are positive. While the

other findings are roughly consistent with our theory and predicts that trade induced child labor effects can be disintegrated into scale, selection and technique effects.

Table 15 shows a negative relationship between child labor and selection effect for SAARC, ASEAN and ASEAN plus SAARC countries in non-interacted form. Results of interacted form indicates a positive association between child labor and selection effect for SAARC and ASEAN countries, while a negative relationship is found in a set of ASEAN plus SAARC countries. The results show that, the strategy for identifying the trade related impacts of scale, selection and technique variables is successful for ASEAN and SAARC countries in a separate setting. The data set observe a noticeable heterogeneity in the number of firms for most of the SAARC and ASEAN countries. Therefore, for the selection effect variable this research is using the number of listed companies per square kilometer or it is a firm intensity in the country. For trade induced child labor selection effect, the selection effect is interacted with trade variable.

Neutral technological progress increases the scale of production (Solow, 1956) and creates a positive trade induced scale effect (Krugman, 1979). According to the results hazardous effects of the scale effect is offset by a negative trade induced child labor scale effect. Therefore, estimates indicate that increases in economic activity driven by the trade induced scale effect lower the child labor. Recall that there are great differences among SAARC and ASEAN countries; therefore, the scale effect is measured in the intensive form  $GDP/km^2$  and trade induced child labor scale effect is derived with the interaction of trade variable. As this

study examines that the deviation in the scale of production across countries can be isolated from technique effect. Therefore the recognition that scale should be examined in intensive form due to theoretical restriction. While, the technique effect is measured by net foreign factor income (NFFI) which is the difference between payment to the foreign people and local country people. This isolation reduces the correlation between the scale and technique effect variables.

Only, selection and scale effect exercise is not tests of new trade theory, if surprisingly, child labor is reduced by an increase in the scale of production and competency of firms, then it will be more interesting to observe the effect of trade induced child labor technique effect in these two regions. The results are reassuringly close to what one may have expected with these effects. More speculatively, these thoughts, trials may also offer a possible explanation for child labor in SAARC and ASEAN countries. Note that, the coefficient of trade induced child labor technique effect Table 15 is negative and significantly different from zero in both SAARC and ASEAN regions. On the other hand, in case of a combine data set of SAARC plus ASEAN countries, there is a positive trade induced child labor technique effect. This is a somewhat surprising result because it is predicted that trade has an overall negative technique effect keeping scale and selection effect constant.

The further investigation reveals that child labor in SAARC countries is much less responsive to technique effect as compared to ASEAN countries. The influence of trade induced technique effect is negative with respect to child labor in a separate setting of SAARC and ASEAN countries. This result is consistent with theoretical predictions as it implies that trade

induced child labor technique effect is negative. While, in a set of SAARC plus ASEAN countries, the child labor increases due to technique effect in these countries, so the hypothesis of negative trade induced child labor technique effect cannot be accepted in a group of both regions. It is worth noting that the coefficient of trade induced technique effect is insignificant for ASEAN countries and Model C for ASEAN countries has a slightly smaller R-squared. While for SAARC countries coefficient of technique effect is very small. So in a set of SAARC plus ASEAN countries, the different sign can be possible. Another point to be noted here that Cambodia and Nepal have high trade to GDP ratios with a high incidence of child labor as compared to other countries. So, these countries together in a group of SAARC and ASEAN countries effects the trade induced child labor technique effects.

The linear interaction term of trade induced technique effect is positive in the set of both SAARC and ASEAN countries and while in a separate setting of these regions has a negative association. It shows that, if a country has a relatively low level of production skills and techniques relative to the rest of the world, then keeping all else held constant, the impact of further openness can make these countries vulnerable to children. On the other hand, Estevez and Levy (2014) examine that, if a country has a sufficiently skilled labor and better technique of production relative to the rest of the world, then the impact of trade induced child labor technique effect can make this country a safer place for children.

Several features of result are presented in the Table 15. First, the trade interactions effects confirm the model's basic predictions regarding selection, scale and technique effects. In

particular, the desired signs from trade interacted regressors are obtained, while the significance levels are reduced by the inclusion of the trade interactions in the separate setting of SAARC and ASEAN countries. Second, the coefficient of trade interacted variables has a great influence, whereas in non- interacted form the coefficient looks very small. Third, the sign pattern of the interaction terms is as expected from theory.

These results indicate that trade induced child labor selection, scale and technique effects are still at work determining, but in non-interacted form selection, scale and technique effects considerations is also matter. The majority of signs and statistical significance of the estimates in Table 15 are according to theoretical predictions. Moreover the signs for the selection, scale and technique are plausible, because in most of the cases, these trade induced effects signs lead to a reduction in child labor.

The remaining part of analysis suggests that freer trade is more likely to be good rather than bad for the child labor and is subject to several provisos. This work has several robust maintained assumptions that may be deceitful, because the data on child labor is not perfect, and may be varied on different data source. Clearly much more need to be done along these lines mentions in this section. In order to meet these demands the next section of this thesis present alternative specification test. Overall the results are surprisingly similar to those presented in this section. The main features of this analysis remain intact along with selection, scale and technique effects.

## 5.4 Alternate Empirical Specifications

To account for the possibilities of robustness to the scale, technique and selection effects, this study proposes an alternative specification in section 5.4.1, by adding education and unemployment. Moreover, section 5.4.2 compares the test results across different groupings of SAARC and ASEAN countries which give a deep understanding of trade induced effects.

### 5.4.1 *Alternative Specification*

In section 5.3, this study compares the alternative econometric models regarding to their ability to explain the robustness of the results obtained in the previous section. The alternative specifications are: Model  $A_2$  and  $C_2$ . In the model  $A_2$  the literacy rate is introduced to represent the education and to examine the robustness of other variables. Education variable was ignored in Model  $A_1$  to check the effect of pure demand side factor scale, selection and technique effect, which does not include any interaction terms, specifies an estimating equation that represents the scale, selection and technique effect in close economy. Model  $C_1$  is a simple trade induced child labor model with no trade variable, whereas trade intensity is interacted in Model  $A_1$  variables i.e. scale, selection and technique effect. Model  $C_2$  includes unemployment as an additional variable. The marginal effects of child labor from other factors are also important for understanding the impact of trade in the given trade and child labor setting. This section briefly summarize the results of models  $A_1$ ,  $A_2$ ,  $C_1$  and  $C_2$ . This section begins with Model  $A_1$  and  $A_2$ , followed by Model  $C_1$ , and finally by Model  $C_2$ .



In the models  $A_1$  for child labor, responses to the selection, scale, and technique effects are statistically significant at the 10 percent level of significance. The coefficient estimates of the scale, and selection effects are statistically significant at the conventional level. Whereas, the coefficient estimate of the technique effect is not statistically significant at conventional levels, although a 95 percent level of confidence is a standard level but the response of technique effect is statistically significant at 90 percent confidence level.

In the model  $A_2$  for child labor, responses to the selection, scale, and technique effects are statistically significant at the 10 percent level of significance. Whereas, the coefficient estimate of the variable for education is not statistically significant at any level of significance. The Model  $A_2$  with education variable, generate statistically insignificant estimates for the child labor. Strikingly, this analysis finds no significant effects of literacy on child labor reduction. The results obtained from EDU variable are not very robust, so, this variable has a trivial effect on other variables. While, in Model  $A_1$  this variable was ignored and the estimates present better significant impacts. In simple words, the scale, selection and technique's effects in autarky situation are not affected by inclusion or exclusion of education variable. For the trade and child labor analysis, random effects estimation of Model  $A_2$  shows that selection effect variable is statistically significant at the 1 percent level of significance. In the cases of child labor, the sole insignificant estimate is education. An explanation of education in this model gives the lack of evidence to support the theoretical prediction in these cases.

**Table 16: Alternative Specification**

Dependent Variable: Child Labor				
Model Specification:	A <sub>1</sub>	A <sub>2</sub>	C <sub>1</sub>	C <sub>2</sub>
SEL	-0.007*** (-3.21)	-0.007*** (-2.98)		
TEC	-0.0008* (-1.79)	-0.001* (-1.70)		
SCL	0.0062*** (7.56)	0.006*** (7.38)		
EDU		0.061 (0.62)		
SELTR			-0.0174 (-0.77)	-0.0139 (-0.53)
TECTR			0.00005* (1.86)	0.00001* (1.78)
SCLTR			-0.0004*** (-3.44)	-0.0005*** (-3.43)
UNEP				-0.0001 (-0.30)
Breusch–Pagan Test	654.46 (0.000)	655.19 (0.000)	741.89 (0.000)	550.18 (0.000)
Hausman Test	6.96 (0.073)	3.02 (0.554)	0.14 (0.86)	1.96 (0.743)
R <sup>2</sup> Overall	0.30	0.37	0.25	0.12

\*\*\*Significance at the 99-percent confidence level.

\*\*Significance at the 95-percent confidence level.

\*Significance at the 90-percent confidence level.

SEL: Country specific number of listed companies per squared kilometer.

SELTR: Selection Effect interacted with the openness of trade.

TEC: Net foreign factor income (NFFI) per capita.

TECTR: Technique Effect interacted with the openness of trade.

SCL: Gross domestic product (GDP) per squared kilometer.

SCLTR: Scale Effect interacted with the openness of trade:

EDU: Percentage of the population age 15 and above who can read and write.

UNEP: Share of the labor force that is without work but available for and seeking employment.

Note:  $\varsigma_{lit} = \alpha_0 + \beta_1 SEL_{it} + \beta_2 SCL_{it} + \beta_3 TEC_{it} + u_{it} \dots$  Model A<sub>1</sub>

$\varsigma_{lit} = \alpha_0 + \beta_1 SEL_{it} + \beta_2 SCL_{it} + \beta_3 TEC_{it} + \beta_4 Edu_{it} + u_{it} \dots$  Model A<sub>2</sub>

$\varsigma_{lit} = \alpha_0 + \beta_1 SELTR_{it} + \beta_2 TECTR_{it} + \beta_3 SCLTR_{it} + u_{it} \dots$  Model C<sub>1</sub>

$\varsigma_{lit} = \alpha_0 + \alpha_1 SELTR_{it} + \alpha_2 TECTR_{it} + \alpha_3 SCLTR_{it} + \alpha_4 UNEP_{it} + u_{it} \dots$  Model C<sub>2</sub>

In model  $C_1$ , only trade-induced effects are estimated. However, and interestingly, the estimates of the selection effect variable are statistically insignificant at the 1, 5 and 10 percent level of significance, the reason of this weak relevance is that the standard error of trade induced selection effect coefficient is very large relative to the statistic, so this statistic is unable to give a significant response. The coefficient of selection has an unexpected negative sign, but without significance. It shows that there is no direct effect of trade induced variables on child labor. While, responses to the scale and technique effects are statistically significant at the 10 percent level of significance.

Model  $C_1$  is extended by including an extra variable unemployment to see the effect of trade induced child labor effects. The new model is Model  $C_2$  and it shows the approximately similar results in term of significance and signs for trade-induced effects i.e. the selection, scale, and technique effects. Hence, this new variable has no significant effect on child labor reduction. The coefficient of unemployment is insignificant and opposite to theoretical explanation. The reason for this unexpected sign and significance is the lack of theoretical support and incongruity for the model which is checking the trade induced child labor effects by using demand side factors for child labor demand while unemployment in Model  $C_2$  address the supply side factors of child labor. That's why the supply side factor is misfit with demand side factor. The remaining part of analysis compares the test results across different groupings of SAARC and ASEAN countries for a deep understanding of trade induced effects.

### ***5.4.2 Robustness of Results***

Table 17 shows that in column 1, without Cambodia and Nepal, the selection effect is positive and consistent with the theoretically predicted strategy that a decrease (increase) in the number of firms leads to a decrease (increase) in the child labor. Results in column 1 express that holding all other variables constant, a unit change in the selection variable brings approximately 20 percent positive change in the level of child labor in the same direction for the data set of selected SAARC and ASEAN countries. It means, if the number of firms decrease the child labor will also decrease. It is important to discuss that the purpose selection effect is not as offering universal explanations or predictions, while this effect enhances the understanding of complex child labor situation in literature.

Next, the scale effect is explained by gross domestic product per kilometer square ( $\text{GDP}/\text{km}^2$ ), the result of scale effect is against the theoretical prediction as it was assumed that an increase in scale of production, increases the demand of child labor due to direct association of labor demand with child labor demand. Estimates of scale effect in models show there is an inverse association between trade induced scale effect and child labor. The coefficient indicates that holding constant all of the other predictors in the model, a unit increase in trade induced scale effects brings 0.01 percent reduction in child labor. It was assumed that this effect can be harmful for child labor, but unpredictably, it is helpful in the child labor reduction. This result strengthens the argument that the increase in scale of production under Krugman framework is beneficial due to demand of skilled labor in the economy.

**Table 17: Robustness of the Results**

Dependent Variable: Child labor				
Estimation Equation: $\varsigma l_{it} = \alpha_0 + \beta_1 Sel_{it} + \beta_2 Tec_{it} + \beta_3 Scl_{it} + \beta_4 Trade_{it} + u_{it}$ . . . Model B				
	(1)	(2)	(3)	(4)
SEL	0.2078*** (3.92)	0.0057 (0.10)	2.014 (0.61)	-0.0197* (-1.69)
TEC	-0.0001*** (-2.90)	0.0001* (1.90)	0.0001 (0.99)	0.0001* (1.75)
SCL	-0.0001*** (-4.23)	-0.0007*** (-3.80)	-0.0001*** (-2.64)	-0.0004*** (-3.33)
Trade	0.369*** (4.03)	0.182*** (2.22)	0.057 (0.288)	0.0132 (0.26)
Breusch–Pagan Test	333.07 (0.000)	245.67 (0.000)	230.67 (0.000)	246.26 (0.000)
Hausman Test	15.86 (0.003)	0.92 (0.921)	1.90 (0.740)	3.911 (0.418)
Observations	105	90	105	135
R <sup>2</sup> Overall	0.31	0.26	0.59	0.29

Note: Figure in the parentheses are t-statistics, except for Breusch–Pagan test, Hausman test, which are p-values.

\*, \*\* and \*\*\* indicate the respective 10%, 5% and 1% significance level.

SEL: Country specific number of listed companies per squared kilometer.

TEC: Net foreign factor income (NFFI) per capita

SCL: Gross Domestic Product (GDP) per squared kilometer

TRADE: Import plus export ratio to GDP

Column 1: Includes the SAARC countries, namely, Bangladesh, India, Pakistan, and Sri Lanka and selected ASEAN countries, namely, Indonesia, Philippine, and Thailand.

Column 2: Includes the SAARC countries, namely, Bangladesh, Pakistan, and Nepal, and ASEAN countries, namely, Cambodia, Indonesia, and Thailand.

Column 3: Includes SAARC countries, namely, Bangladesh, Pakistan, Nepal, and Sri Lanka and selected ASEAN countries, namely, Cambodia, Philippine, and Thailand.

Column 4: Includes major SAARC countries, namely, Bangladesh, India, Pakistan, Nepal, and Sri Lanka and selected ASEAN countries, namely, Cambodia, Indonesia, Philippine, and Thailand.

The technique effect is described by the lagged per capita net foreign factor income (NFFI). Regression estimates for column 1 suggests that there is a negative association between technique effect and child labor. In column 1, a one unit increase in technique effect variable can cause up to a 0.01 percent decline in child labor. The t-value ( $t = -2.90$ ) denotes that the estimated coefficients, for trade induced technique effect, are statistically different from zero at conventional levels of significance.

The trade variable is represented by a trade to GDP ratio. In main model, which assumes linearity in all regressors, the coefficient of trade openness is statistically significant at a one percent level of significance. This result shows a substantial evidence to suggest that a one unit change in trade intensity brings a 36.96 percent positive change in child labor. The estimated coefficient is significantly different from theoretical proposition. Trade variable has unexpected and significant positive sign. This could result from a non-distinction between the trade of differentiated goods and trade of homogeneous goods, similar result has already been reported by Kis-Katos (2006), as she concluded that the real income effect of trade can also increase the aggregate child labor and the impact of trade on the child labor also depends on the techniques of productions with a change in income levels across countries.

The second column in Table 17 shows the set of three countries each from SAARC and ASEAN countries. This set encompasses Pakistan, Bangladesh and Nepal from SAARC region while from the ASEAN region, Indonesia, Cambodia and Thailand are included because on average incidents of child labor is high as compared to other countries. These results show that

the coefficient of selection effect is not significant, however the sign of this variable is positively associated with child labor. The sign of selection effect variable, with respect to child labor, is positive and consistent with the theoretically predicted strategy that a decrease (increase) in the number of firms leads to a decrease (increase) in the child labor.

The next variable in terms of strength of association with child labor is scale effect, it is described by gross domestic product per kilometer square ( $GDP/km^2$ ), The result of scale effect is against the theoretical prediction as it was previously assumed to increase in scale of production, increases the demand of child labor due to direct association of labor demand with child labor demand. Estimates of scale effect in the Model B show a statistically significant negative relationship between scale effect and child labor. The coefficient estimates indicate that holding the all remaining factors constant, a unit increase in scale effect variable brings 0.07 percent reduction in child labor. It was assumed that child labor can increase due to scale effect, while child labor is decreasing due to this effect. This result strengthens the significance that the scale of production in the economy when it is aligned with the openness of trade.

The technique effect shows a positive association with child labor. In column 2, a one unit increase in technique effect variable brings a 0.01 percent rise in child labor. The p-value denotes that the estimated coefficients, for technique effect, are statistically different from zero at the 10 percent level of significance.

The coefficient estimate of trade intensity is statistically significant at the 1 percent level of significance. This result provides a substantial evidence to suggest that a one unit increase in trade intensity variable brings a 18.23 percent increase in child labor. The relationship of trade and child labor receives a considerable theoretical attention because available theoretical and empirical literature on child labor under the new trade theory is not well equipped. The stressing sign of trade variable can reverse the conclusion. Instead of positive effect on child labor, trade may turn the effect into negative one. This result is consistent with the Kis–Katos (2006) findings, as she examine that the real income effect of trade can also increase the aggregate child labor and the impact of trade on the child labor also depends on the techniques of productions with varying income levels across the SAARC and ASEAN countries.

Column 3 of Table 17 shows the responses of changes in the scale, selection and technique effects on the level of child labor, in seven SAARC and ASEAN countries taking three countries from ASEAN and four from SAARC region. The random effects model is found to be more efficient and appropriate in Hausman test. Random effects estimations indicate that there are two opposing theoretical predictions in column 3. Firstly, the technique effect which is statistically insignificant and secondly, the scale effect which is an optimal reverse prediction in favor of child labor reduction activities. This analysis explains that selection effect is a reliable predictor of future real economic activity. The direction of the effect of the selected variable on the child labor is positive, consistent with the theoretically predicted strategy that a decrease (increase) in the number of firms leads to a decrease (increase) in the level of child labor. Statistically insignificant, but the economically significant coefficient is still an important



predictor in column 3 of Table 17. The only scale effect variable in column 3 shows a statistical significant relevance with child labor. This effect is statistically and economically significant at the conventional significance level ( $p < 0.05$ ). The sign and statistical significance are consistent with previous research of Edmonds and Pavcnik (2006).

The standard errors of other variables are relatively large and these estimates are not significant at the 5 percent level of significance, therefore, the technique and selection effects are statistically insignificant at conventional levels of significance. Similarly, the association between trade and child labor is not statistically significant. P-values indicate that the null hypothesis cannot be accepted at the 5 percent level of significance. In this analysis, selection and technique variables are not statistically significant; while the scale effect is statistically significant. It would suggest that only scale effect exists, but the remaining selection effect and technique effects are absent.

Table 17 reports the statistically significant estimates for the technique and scale effects in column 4 at the 1 percent level of significance. Both effects have a negative association with child labor. The findings of scale effect endorse the negative relationship between scale and child labor. For the scale effect, the coefficient estimates are statistically significant at the 1 percent level in column 4. There is strong evidence to suggest that a one unit increase in scale of production brings 0.04 percent decrease in child labor. A one unit increase in the trade induced selection effect variable leads to 1.97 percent decrease in child labor in column 4.

Estimates for trade variable is statistically insignificant at conventional levels. More formally, t-test cannot reject the null hypothesis that the coefficient estimate of the trade variable is equal to zero. On the basis of these estimates, there is an absence of trade intensity effect independently. The absence of a trade variable on child labor may be described by the possibility that the variations in the level of trade intensity do not affect child labor directly, but trade is a source of trade induced child labor effect as explained in this trade and child labor framework.

In determining the appropriateness of the estimator i.e fixed effect estimator versus random effect estimator Hausman test and Sargan-Hansen test with cluster-robust standard errors are recommended in this study. The Hausman test, presented in column 1 of Table 17, shows that at conventional levels of significance null hypothesis can be rejected, as it validates the addition orthogonality condition under random effects estimator. In comparison, it is important to note that, statistically significant coefficient estimates are derived from estimations by excluding Cambodia and Nepal under fixed effects estimation in Table 17. The remaining estimates of Table 17 gives a sufficient evidence against fixed effect estimates. Therefore, in all remaining models, there is a sufficient evidence to suggest that the estimate derived from random effect estimators are consistent and efficient. The interesting finding in these results is that, statistically insignificant coefficients are obtained on exclusion of India and Indonesia from a given data set. These results express that exclusion of India and Indonesia from selected ASEAN and major SAARC countries has adverse effect on estimation results. On the other hand, the estimation of column 2 shows that, there is evidence to suggest that estimates

generated by the random effects models are consistent and efficient. In this case, therefore, in explaining the following regression results, a similar trend is found in full, sample of all selected ASEAN and major SAARC countries, therefore this analysis demonstrates the estimates based on the random effect models.

Table 16 and 17 points two different estimation options i.e. fixed and random effects model with dependent variable child labor. In Table 17, the results of selection, scale and technique effects along with trade intensity are presented. While in the Table 16 a sensitivity analysis of scale, selection and technique effects in both autarky and open economies are presented by including some other variables in estimation equation. Table 16 comprising of four estimating models Model A<sub>1</sub>, Model A<sub>2</sub>, Model C<sub>1</sub> and Model C<sub>2</sub>. Model A<sub>1</sub> and A<sub>2</sub> don't deal with trade intensity separately while in Model C<sub>1</sub> and Model C<sub>2</sub> trade intensity is interacted with selection, scale and technique effects to check the effect of trade induced child labor scale, selection and technique effect. These results suggest that trade induced effects exist in SAARC and ASEAN countries when it is calculated for average country in the sample. The findings of Table 17 and 15 propose the following links of trade and child labor.

First, Selection, scale and technique effects of close economy and trade induced child labor selection, scale and technique effects seemed simply to be correlated with child labor.

Second, there is substantial evidence to support the main idea that the selection effect is an important variable in the treatment of child labor. All models estimated with a number of

firms in the close and open economy, it is seen that the main findings are robust with respect to a number of firms (selection effect) and trade induced child labor selection effects. In the models  $A_1$  to  $C_2$ , the coefficient estimates of the selection effect variable are significant in the closed economy model while the trade interacted model this variable lost the significance.

Third, the estimates of the coefficients of scale effect variables in the closed and open economy are statistically significant at all levels of significance. These findings indicate the relative importance of scale effect with respect to significance.

Fourth, The exceptions found the mixed evidence to responses the effects of the technique and scale effects on child labor in the closed and open economy. Comparatively, the coefficient estimates of the effects of scale and technique variables look very small but they are theoretically important and statistically significant for an explanation of the child labor phenomenon.

Fifth, the education and unemployment provide insignificant explanation. Results show that for the child labor, adding new variable, i.e. education and unemployment have no effect on selection, scale and technique effect variables.

Finally, trade intensity variable is not part of the alternative specification, this specification uses the unemployment and education instead of trade variable. The result found

that substituting variable are irrelevant in models  $A_2$  and  $C_2$ . Only the trade variable has a capacity to explain the effect of trade with the help of trade induced child labor effect.

## **CHAPTER 6**

### **CONCLUSION AND RECOMMENDATIONS**

#### **6.1 Chapter Overview**

This chapter contains several sections: the first section reiterates the findings and highlights the key results of the research work, followed by discussions on trade induced child labor selection, scale and technique effects. The chapter closes with a discussion of the limitations of the study and policy and recommendations based on the results of this research.

#### **6.2 Summary of the Results**

The premise of the analysis explores that the international trade is integrated with the trade of differentiated goods described by the framework of new trade theory and trade of homogenous goods described by the theoretical framework of traditional trade. However, the composite effects of an integrated open economy can be disintegrated into various trade induced effects. In doing so, this dissertation aims to ascertain whether the impact of trade of differentiated products on child labor can be decomposed into selection, scale and technique effects. The past empirical studies, which are based on the traditional trade framework, show that the child labor is linked to the comparative advantage in trade. On the contrary, in this

research the comparative advantage is altered by product differentiation which need a better skills hence less chances of child labor.

The analysis complements the existing literature on the subject of child labor by discussing the role of trade induced child labor effects in Krugman (1979) model. According to new trade theory, a country that starts out with a largely unskilled labor risks being excluded from trade in differentiated goods with the other countries, as the latter form exclusive clubs. Trade openness can thus further impoverish developing countries with particularly unfavorable initial conditions. For all these reasons, child labor is likely to rise. The results seem to be fairly robust to alternate model specifications. The analysis casts doubts about the wisdom of using trade openness to control child labor. Instead, the results suggest that trade induced child labor selection, scale and technique effects are effective in reducing child labor in SAARC and ASEAN countries. However, the analysis could not find empirical evidence that exposure to international trade reduce the incidence of child labor.

Theoretical framework has presented an imperfect competition model of a small developing country to examine the incidence of child labor. A general conclusion which can be drawn from the framework is that the trade will be more effective, if its effects applied at a more disaggregated level. This conclusion has been reached by comparing the different effects of trade on developing countries. Furthermore, the framework suggests that trade openness to combat the child labor can be examined carefully by using trade induced child labor effects. The study also focuses on the mechanisms other than income through which trade might affect child

labor that are often the focus of the anti-globalization movement. The analysis finds no support for the view that selection, scale and technique effects instigated by trade are associated with increases in child labor. The intuition looks realistic and when it is investigated solely on SAARC and ASEAN countries.

The results confirm that if firms are engaged in production of differentiated products in an integrated economy, then an empirical estimation of the total impact of trade on the child labor needs to be accounted for a selection effect in addition to scale and technique effects. This has a national and global significance because it highlights the association between the selection effect of the trade and child labor. The ex-ante theoretical realization is admissible with ex post parameters for selection, scale and technique effects. In some measures, expectations for the effects are aligned with theoretical forecast, while in some cases the predictors appear to have an opposite effect from the one intended.

The selection effect is the impact of economic integration with trade driven market structure through product differentiation associated with choice process. Openness of trade not only affects the number of firms (a number of varieties) inside the economy, but also the incidence of child labor across the international borders. A theoretical explanation of selection effect is that, holding the scale and technique effects constant, trade in differentiated goods induces a trade related child labor selection effect i.e. openness to trade implies an access to foreign market, which leads to a change in the number of domestic firms or in the number of



product varieties. The change in the number of firms or number of varieties brings a change in child labor or simply it is called a trade induced child labor selection effect.

The results show that, selection effect hypothesis holds true in the case of SAARC and ASEAN countries when Cambodia and Nepal are excluded from the data set. The empirical result in conjunction with the theoretical backdrop gives the consonant sign for the selection effect in the selected group of seven SAARC and ASEAN countries. While in full group of major SAARC and selected ASEAN countries, statistically significant coefficient estimates found mixed evidence, the results are robust across the different empirical models and across different combinations of countries. The empirical estimates confirm the prediction of trade-induced child labor selection effect postulated by the trade framework. In other words, there seems a robust indication to support the hypothesis that the change in the incidence of child labor is due to the selection effect. Furthermore, the current analysis proposes a linear relationship between the selection effect and child labor and the sign of the trade induced child labor selection parameter is expected to be positive under trade and child labor framework.

The findings are robust to the selection effect for the trade framework. The results endorse that a change in the number of firms brings a proportionate change in the child labor, holding other things constant. The emancipation of child labor from selection effects is found nearly opposite in their direction. Furthermore, theoretically important outcomes can be described by underlying assumptions of the trade and child labor frameworks which is transformed into econometric models for validation. The theoretical expectations are consistent

with the new trade theory, by considering that countries are engaged in the trade of both homogeneous and differentiated goods. An adequate explanation of empirical evidence favors the hypotheses postulated by a theory that child labor is affected by selection effects in an open economy. The estimation shows the impact of international trade on child labor needs to be controlled for the selection effect, simultaneously, the commonly accepted scale and technique effect of international trade. The estimates of selection effect are shown to be robust across five different specifications and across 9 SAARC and ASEAN countries with a different set of combination.

The findings are based on previous work on trade and child labor literature, which seek to resolve the heated debate and serious concern about the international trade. This study departs considerably from much previous work by professing the estimation of the impact of international trade on child labor which needs to account for a selection effect, a variable that can be favorable to describe the patterns of the exchange of goods across borders. The potential of unbiased estimation lies in the effect to resolve the important issue which may be significant for policy recommendations.

The findings of trade induced child labor scale effect strongly refute the presumption that child labor may increase with the increase in scale of production. In simple words, the scale of production due to trade liberalization is not a hazard for a reduction in child labor. Trade induced child labor scale effect finds a considerate feedback to the treatment of child labor in two ways. First, the main econometric model of the current analysis finds a statistically

significant negative relationship between the scale of production and child labor level, which is not consistent with theoretical predictions. However, in the context of child labor, the scale effect can be confounded by the fact that interaction of trade intensity enables this effect to control child labor. The ongoing econometric models for trade and child labor suggest that an increase (decrease) in the level of scale of production lowers (raises) the child labor, holding everything else constant. Second, the responses of the trade induced child labor scale effect variable are statistically significant for the functional form which specifies linearity in the scale variable. These results present the regional evidence on the transformation of economic growth to a child labor reduction in the SAARC and ASEAN countries, with the emphasis on the role of trade induced child labor scale and technique effects. In the context of international trade effects, the evidence suggests that the realization of data has a substantiate assertions that trade driven scale effects play a significant role in falling child labor.

The ongoing analysis finds that there is a lack of statistical evidence for trade openness. These revelations are sufficiently startling to show the need of further investigation. The expected favorable effects of trade liberalization on child labor depend on the Kis-Katos and Sparrow (2007) which has been examined both on theoretical and empirical grounds by many researchers. Rahman and Khanam (2012) found that the theoretical arguments regarding the effects of trade on child labor is ambiguous and empirical evidences also provide us mixed results. The findings of trade openness are not too encouraging. These findings may raise concerns regarding the effect of trade on child labor. From a normative perspective, child labor is largely a phenomenon of poverty, an improvement in the income opportunity due to trade

opportunities can help the developing countries to reduce child labor. The findings in this research corroborate that technique effect is statistically significant for child labor. The regression results, for the countries in the sample, show that estimates of the technique and scale effects can be revealed with the new trade theory framework as contrasted with the traditional trade theory framework. Estimations of the scale and technique effects for the child labor generate mixed findings regarding the inherent characteristics and sources of child labor.

The explanation of favorable effects of trade liberalization on child labor is that when domestic borders opens for foreign countries, it brings better technology in the home country. So, adaptation of less labor intensive technology produced abroad substitute for labor intensive technologies used domestically, thus a reduction in child labor in the home market. A second possible justification is that openness to trade can bring labor amelioration that is embedded with imported production technology. The diffusion of better techniques of production in the domestic market alleviates child labor. Interestingly, these possibilities are inconsistent with the result of positive coefficient estimates of trade, which are statistically significant in the models for child labor. The results show that, the coefficient estimates of the trade intensity variable are consistently positive in signs for all specifications. The results show that international trade has adverse effect on child labor, depending on the available data and speciation of the model.

These results negate the theoretical prediction that greater openness to trade leads the lesser the child labor. The theoretical framework purpose analysis suggests that openness to trade or trade liberalization reduces the child labor. While available raw data rule out the

theoretical evidence. So, the widespread trade and child labor realization need to be decomposed into trade induced child labor selection, scale and technique effects.

Theoretical analysis of child labor in this study develops a theoretical model that clarifies the role of trade of differentiated products on child labor as distinct. There are some unique contributions related to study and use of theory, one, this research proposes an empirical framework for analyzing the trade and child labor relationship which integrates the effects differentiated products on child labor. Two, it tests the theoretical treatment of child labor by using selection, scale and technique variables. More specifically, it tests the selection effect on the child labor level. Three, it investigates the impact of trade on the child labor in SAARC and ASEAN countries, namely, Bangladesh, India, Nepal, Pakistan, Sri Lanka, Cambodia, Indonesia, Philippine, and Thailand. Lastly, it provides an evidence to answer the central question, how the trade induced effects can influence the child labor.

### **6.3 Recommendations of the Study**

Based on the results of the analysis, it looks that trade is harmful for child labor. While trade induced child labor effects are beneficial for child labor. If it is assumed that trade is harmful for child labor, then policy makers recommend trade sanctions on countries. Maskus (1997) and Estevez (2011) provide a detailed discussion of this point and conclude that the sanction has probably counterproductive because sanctions are very likely to harm children rather than help them. Sanctions diminish the life alternatives and newly unemployed children

have to live in a household with a lower family income and less nutrition. In fact, the trade sanctions in developing countries are deceptive, disingenuous and misguided because of political forces. The data of trade to GDP ratios for SAARC and ASEAN countries suggest that trade to GDP ratio is unfavorable. So, it is recommended that these countries should increase the volume of trade to improve the trade to GDP ratio.

This research is not arguing that child labor is good and desirable per se. In fact, it is assumed that in an ideal world, children would not have to work and be able to spend all their time on education. What this research makes clear is that such an ideal world can be afforded only if countries are free to trade. The harsh truth is that comparative advantage of trade is considered as a root causes of child labor, still exist and will continue for the foreseeable future. A complete elimination of the demand for child labor is not realistic (not possible due to some informal sectors of an economy), while the sectors that are engaged in production and trade of differentiated products can be incentivized through the use of targeted policies that takes into account the association between the productivity of firms in a specific sector and its effect on the demand for child labor. However, it is essential to have a reasonable confidence that trade policies put in place will reduce the child labor.

Firms that are engaged in production of differentiated goods need to be incentivized through the use of targeted trade policy. The firms where the productivity gap between skilled (adult workers) and unskilled (child labor) small, trade liberalization can have adverse effects on the demand for child labor. Trade liberalization can be successful, however, in industries

where the productivity gap between skilled (adult) and unskilled (child workers) labor is relatively large and the more productive firms see little benefit in employing children. In this scenario, the trade will result in the exit of firms that employ proportionally more children, which will lead to a decrease in the demand for child labor. Child labor penalty, which increase production costs and are generally accompanied by negative welfare effects, can also be used to decrease the profitability of firms that heavily rely on child labor.

#### **6.4 Limitations of the Study**

The selection effect is an avenue through which child labor can change following trade liberalization. In particular, if the least-efficient firms are the ones to exit, then the demand of child labor will decrease. Note that the “symmetry” assumption that all firms are of the same size and efficiency (it follows that the exit of some would not automatically change child labor). This assumption was made for analytical convenience, but contradicts the empirical fact that every country has a very wide range of firms operating within it.

The empirical literature on demand side factors of child labor is relatively limited due to the scarcity of reliable data. Unfortunately, it is difficult to obtain firm level data on child labor, which can be beneficial to validate the results and even the survey’s reliability can be uncertain due to resistance by firms to disclose the information on the child labor and wages paid to these unlawful workers. Data of adult labor is widely available while the data for economically active children with respect to different age groups and occupation are virtually non-existent. Such

information is crucial for calculating the trade induced child labor effects. The lack of perfect data hampered the study's ability to determine the trade induced child labor effects. So, there is an evident need for time series data on child labor.

## **6.5 Directions for Future Research**

A brief review of different trade induced effects suggests that further analysis of the microfoundations of the trade-child labor links is a rich area for future research, shedding further light on the broad linkages empirically examined in this research. The empirical estimates cannot be able to find any direct circumstances of the trade that stimulated higher incidences of child labor that trying to identify such circumstances in the future could be the direction of future research. It is important to discuss that the purpose selection effect is not as offering universal explanations or predictions, while this effect enhances the understanding of complex child labor situation in literature. There may be some legitimate concern with the impact of labor practices on SAARC and ASEAN region workers, which may be equally motivated by humanitarian concerns for children. The selection effect discussed in this dissertation can be equally motivated on moral grounds related to the consumer for SAARC and ASEAN countries is another direction for the future researchers. As a closing comment, it is important to stress the fact that many directions for future research are now open. This study believes that the dynamics of educational achievement must be modeled together with labor market dynamics. This is a topic of great interest.



## **6.6 Policy Implications**

The concluding part finds out that child labor is falling in SAARC and ASEAN region, but it may have a number of informal explanations. The trade induced effects under the new trade theory can implement a range of strategies to improve the compliance. Due to trade induced child labor effects, SAARC and ASEAN countries would no longer need child labor to gain a comparative advantage because most of the countries in both regions can compete on a more level of the playing field. This dissertation sets out the following policy implication which takes into account the validity of the research.

### ***6.6.1 Policy Implication of Scale and Technique Effects***

Trade induced child labor effects are allowing the earnest support to reduce the child labor, but they need a further technical support and rigorous empirical evaluation. The question arises which trade induced effect appears to have a greatest reduce the child labor. First and foremost, the empirical evidence points out the role of trade induced child labor technique and scale effects in giving rise to the elimination of inefficient child labor. From a theoretical perspective, countries without access to better technique of production may not be able to reduce the child labor. Estevez and Levy (2014) also examine that advancement in the technique of production is biased toward skilled workers, and less chances of unskilled labor or child labor in the production of differentiated goods. The results of this study suggest that SAARC and ASEAN countries should have a sufficiently skilled labor and better technique of

production relative to the rest of the world, then the impact of trade induced child labor technique effect will make this country a safer place for children.

The economies of scale (scale effect) have a centrifugal effect towards the child labor, tends to push economic activity into spreading out and would be opposed by the centripetal pull of access to world markets, which tend to promote concentration of economic activity. In the production of differentiated products the economy continues to grow and the supply of low skilled jobs dries up and sustained growth will result in an increase in high skilled jobs in all sectors. This, in turn, will decrease child employment. It is therefore expected that the impact of growth will lead to a shift toward more skilled workers and less child labor. So, this study recommends that the increase in scale of production need to be continue in SAARC and ASEAN countries.

#### ***6.6.2 Policy Implications of Selection Effect***

In general the child labor enforcement strategies draw resources from other productive activities in the economy. These resources might be better devoted to other strategies with the help of trade induced child labor selection effect. This study suggests that the aggregate welfare of trade induced child labor selection effect may be higher by allowing some child labor to exist rather than seeking for complete elimination of child labor. Progress toward the elimination of child labor can be made with a fall in the number of firms. This analysis also finds out that an additional specialization in the form of differentiated products can be a source of trade between

the countries. The differentiation requires better labor skills and techniques. So, it nullifies the role of unproductive labor practices (child labor) and the policy implication of selection effect is fairly subtle. So, a successful product differentiation strategy is recommended to reduce the child labor in SAARC and ASEAN countries.

### ***6.6.3 Policy Implication of Trade Openness***

Indeed, trade liberalization improves the earnings opportunities for local citizen of countries and trade liberalization raises the country's exposure to international competition. In this way inefficient firms in import competing industries may be forced out of competition in business. Regardless of the long run, gains from the re-allocation of resources, in the short run, these arrangements may be a sterilizing factor for child labor treatment. So, it is recommended that trade facilities in SAARC and ASEAN should be flourished.

Finally, this research proposes that the trade induced child labor effects can be worthwhile to address the underlying economies that gives a rise to offend child labor practices. As discussed previously, trade sanctions arguably lie at the heart of the most egregious forms of child labor exploitation in developing countries. If these countries have an easy access to global markets, they would be able to enhance the scale of production and finally it improves production technique due to income improvements. The end result, of course, is adequate child labor reduction.

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## APPENDIX A

### A.1 Monopolistic Competition and the Child Labor

#### A.1.1 Production

The profit function is the firm's revenue less labor cost and child labor penalties such that:

$$\pi_i = p_i (1 - \alpha_i) x_i - w\alpha - (w\beta + \tau \zeta l_i) x_i \quad \dots (A-1)$$

Where in monopolistic competition  $P = AR = ATC = LRAC$

$$p = p_i (1 - \alpha_i) x_i \quad \dots (A-2)$$

By putting the values of  $p_i$  and  $\zeta l_i$ , in equation 11 (see, Chapter 4), the following profit function is obtained:

$$\pi_i = p_i ((1 - \alpha_i) x_i) ((1 - \alpha_i) x_i) - w\alpha - w\beta x_i - \tau (1 - \alpha_i)^\sigma x_i \quad \dots (A-3)$$

#### A.1.2 First Order Conditions

First order conditions for profit maximization with respect to  $x$  implies:

$$p'(1 - \alpha)^2 x + p(1 - \alpha) - w\beta - t(1 - \alpha)^\sigma = 0 \dots (A-4)$$

Divide equation by  $(1 - \alpha)$  and rearrange to obtain:

$$p'(1 - \alpha)x + p - t(1 - \alpha)^{\sigma-1} - w\beta(1 - \alpha)^{-1} \dots (A-5)$$

The first order conditions for profit maximization with respect to  $\alpha$  is:

$$-xp'(1 - \alpha)x - xp + \sigma t(1 - \alpha)^{\sigma-1}x = 0 \dots (A-6)$$

Divide the equation (A-6) by  $-x$  and rearrange, equation (A-6) can be written as:

$$p'(1 - \alpha)x + p - \sigma t(1 - \alpha)^{\sigma-1} = 0 \dots (A-7)$$

### A.1.3 Second Order Conditions

The second order condition for profit maximization with respect to quantity of output is:

$$\frac{\partial^2 \pi}{\partial x^2} = p''(1 - \alpha)x(1 - \alpha)x + p'(1 - \alpha)^2 + p'(1 - \alpha) \dots (A-8)$$

Since  $p' = \frac{\partial p}{\partial x} < 0$  and assuming  $p'' = \frac{\partial^2 p}{\partial x^2} < 0$ , then  $\frac{\partial^2 \pi}{\partial x^2} < 0$  and satisfy the second order condition for a maximization.  $\frac{\partial p}{\partial x}$ ,  $\frac{\partial^2 p}{\partial x^2}$  and  $\frac{\partial^2 \pi}{\partial x^2}$  shows that increase in the production has an

inverse effect on prices and profits of the firms, so there is need to check these effects by using  $\hat{A}$  which is fraction of output allocated towards labor amelioration.

The second order condition for profit maximization with respect to resources allocated for labor amelioration is:

$$\frac{\partial^2 \pi}{\partial \hat{A}^2} = -xp''(-x)(1 - \hat{A})x + xp'(1 - \hat{A})x(-1)x + p'(-x) + (\sigma - 1)\sigma t(1 - \hat{A})^{\sigma-2}(-1) \dots (A-9)$$

Since  $p' = \frac{\partial p}{\partial \hat{A}} > 0$  and assuming  $p'' = \frac{\partial^2 p}{\partial \hat{A}^2} < 0$ , then  $\frac{\partial^2 \pi}{\partial \hat{A}^2} > 0$  and satisfy the second order condition for a maximization.

$\frac{\partial p}{\partial \hat{A}} > 0$ ,  $\frac{\partial^2 p}{\partial \hat{A}^2} < 0$  and  $\frac{\partial^2 \pi}{\partial \hat{A}^2} > 0$ , shows that, firstly the fraction of output allocated towards a labor amelioration, increase the product price but after that due to an amelioration in the labor less fraction of output allocated towards labor amelioration, hence it decreases the product price prices and lesser resources allocated towards the labor amelioration.

## A.2 The Labor Amelioration

Rearrange, equation (A-5) and equation (A-7) to obtain:

$$\sigma t(1 - \hat{A})^{\sigma-1} - t(1 - \hat{A})^{\sigma-1} = w\beta(1 - \hat{A})^{-1} \dots (A-10)$$

Dividing through by  $(1 - \mathring{A})^{-1}$ , collect terms and rearrange to obtain:

$$\tau(1 - \mathring{A})^\sigma(\sigma - 1) = w\beta \quad \dots (A-11)$$

$$(1 - \mathring{A})^\sigma = \left( \frac{w\beta}{\tau(\sigma - 1)} \right)$$

$$(1 - \mathring{A}) = \left( \frac{w\beta}{\tau(\sigma - 1)} \right)^{\frac{1}{\sigma}}$$

$$\mathring{A} = 1 - \left( \frac{w\beta}{\tau(\sigma - 1)} \right)^{\frac{1}{\sigma}} \quad \dots (A-12)$$

When firms hire the labor at high cost, then, skilled, trained and educated workers are preferred then no need of training (amelioration), on the other hand, if firms take the labor at very low cost then there is a need of amelioration for the workers (Freeman, 2000). Thus, the fraction of output allocated towards labor amelioration.

Then, substituting into equation 9 (see, Chapter 4), the equation for child labor intensity can be written as:

$$cl = (1 - \mathring{A})^\sigma \quad \dots (A-13)$$

$$(1 - \mathring{A}) = \left( \frac{w\beta}{\tau(\sigma - 1)} \right)^{\frac{1}{\sigma}} \quad \text{see equation (A-11)}$$

$$cl = \left( \frac{w\beta}{t(\sigma-1)} \right)^{\frac{1}{\sigma}} \dots (A-14)$$

Equation (A-14) shows that wage ( $w$ ) and co-efficient of wage are directly related to child labor, but child labor penalties and response in child labor due to the fraction of output allocated towards the consumption are inversely proportion to child labor.

**A.3 Table A.1: Relationship of Child Labor and Amelioration with Different Variables**

Variables	Amelioration ( $\hat{A}$ )	Child Labor ( $cl$ )
$w$	-ve	+ve
$\beta$	-ve	+ve
$t$	+ve	-ve
$\sigma$	+ve	-ve

Note: -ve indicate the negative relationship with child labor and amelioration.  
+ve indicate the positive relationship with child labor and amelioration.

#### A.4 Effects of Child Labor Policy

Changes in the child labor policy can have implication effects on the consumer welfare as well as economic preference. If a country wants a better quality care for vulnerable children, for example, in the form of no child labor is desirable, then, stringent child labor regulation can be imposed to attain it. However, a strict child labor policy affects the firm's production decisions in the consideration of rising compliance costs. Hence, in the developing economy, there exists a trade-off between the achievements of child labor policies and economic objectives. This section of study analyzes the effects of an increase the robustness of child labor policy. More exclusively, the comparative effects of an increase in child labor rate are examined

for the following variables: the fraction of output allocated towards amelioration, and child labor intensity.

## A.5 Amelioration

Theoretically, an increase in child labor penalty is expected to increase the fraction of output used for the amelioration of labor. Thus, if child labor penalty increase then the marginal benefit of reducing child labor increases.

From equation (A-12), the effect of a change in the child labor penalty to the level of amelioration can be shown as follows:

$$\hat{A} = 1 - \left( \frac{w\beta}{t(\sigma-1)} \right)^{\frac{1}{\sigma}}$$

$$\frac{\partial \hat{A}}{\partial t} = \frac{(t^{-2})}{\sigma} \left( \frac{w\beta}{t(\sigma-1)} \right)^{\left(\frac{1}{\sigma}-1\right)} \left( \frac{w\beta}{\sigma-1} \right) > 0$$

The result shows that the direction of the relationship between a positive change in the child labor penalty and fraction of output allocated for amelioration is positive. Hence, an increase in child labor penalty increases the fraction of output allocated for the amelioration of labor. In other words, stricter child labor regulation acts as an incentive for the firm to assign a greater amount of resources for the amelioration of labor from the firm.

The increase in child labor penalty necessitates the firm to increase the allocation of output for labor amelioration and reduce the child labor penalty payments.

## A.6 Child Labor Intensity

From equation (A-14), the effect of a change in child labor penalty on child labor intensity is given by the following:

$$cl = \left( \frac{w\beta}{t(\sigma - 1)} \right)$$

$$\frac{\partial cl}{\partial t} = -t^{-2} \left( \frac{w\beta}{\sigma - 1} \right) < 0$$

An increase in the child labor penalty persuades the firms to allocate more resources towards reducing child labor. This result is consistent with the theoretical expectation that a stricter child labor policy leads to the firm's decision to increase its labor amelioration. Further, since the level of amelioration is increasing, that increases the wage rate or income which leads to a decrease in child labor intensity.

## A.7 Policy Induced Child Effects

Solve for  $n$  firms (see equation 6 chapter 4)

$$\sum_{i=1}^n \varsigma l_i = \sum_{i=1}^n N x_i \dots (A-15)$$

Putting the value of  $N$  (see equation 8, Chapter 4)

$$\sum_{i=1}^n \varsigma l_i = \sum_{i=1}^n x_i (1 - \mathring{A}) q_i^{-1} \cdot x_i$$

$$\text{Let } x_i (1 - \mathring{A}) q_i^{-1} = \mathring{A}_i$$

$$\sum_{i=1}^n \varsigma l_i = \sum_{i=1}^n \mathring{A}_i \cdot x_i$$

$$n \varsigma l = n \cdot \mathring{A} \cdot x \dots (A-16)$$

$$\text{Let } n \varsigma l = CL$$

$$CL = n \cdot \mathring{A} \cdot x \dots (A-17)$$

Take a logarithmic transformation of the equation equation (A-17) and write as:

$$\log CL = \log n + \log \mathring{A} + \log x \dots (A-18)$$

Totally differentiate:

$$\frac{1}{CL} dCL = \frac{1}{n} dn + \frac{1}{CL} dCL + \frac{1}{x} dx \text{ or } \frac{dCL}{CL} = \frac{dn}{n} + \frac{d\mathring{A}}{\mathring{A}} + \frac{dx}{x} \dots (A-19)$$

Then, take the percent change (multiply through by 100%) to obtain:

$$\widehat{CL} = \hat{n} + \hat{\mathring{A}} + \hat{x} \dots (A-20)$$

Thus, equation (A-18) shows that the impact of regulation on child labor can be disintegrated into the selection, technique and scale effects in the following way:



Selection effect	=	$\hat{n}$
Technique effect	=	$\hat{A}$
Scale effect	=	$\hat{x}$

Hence, the impact of the production of differentiated goods generates three types of effects, namely the selection, scale and technique effects.

**A.8 Table A.2: Policy Induced Child Labor Effects**

Equation	Description
$\frac{\partial \hat{A}}{\partial t} = \frac{(t^{-2})}{\sigma} \left( \frac{w\beta}{t(\sigma-1)} \right)^{\left(\frac{1}{\sigma}-1\right)} \left( \frac{w\beta}{\sigma-1} \right) > 0$	An increase in child labor penalty increases the labor amelioration by firms.
$\frac{\partial cl}{\partial t} = -t^{-2} \left( \frac{w\beta}{\sigma-1} \right) < 0$	An increase in child labor penalty decreases the child labor intensity. This is policy induced technique effect.
$p' = \frac{\partial p}{\partial \hat{A}} > 0$ and $p'' = \frac{\partial^2 p}{\partial \hat{A}^2} < 0$	An increase in child labor penalty increase the labor amelioration it raises the price level initially, then fall in the price level.
$p' = \frac{\partial p}{\partial x} < 0$ and $p'' = \frac{\partial^2 p}{\partial x^2} < 0$ then $\frac{\partial^2 \pi}{\partial x^2} < 0$	An increase in production increases the supply of goods and services. It decreases the price of and profit margins.
$\widehat{CL} = \hat{n} + \hat{A} + \hat{x}$ .	An increase in child labor penalty may increase or decrease the total level child labor in economy depending on the sum of policy induced scale, technique and selection effects.

In autarky case, this model shows that the effect of child policy can be decomposed into policy induced selection, scale and technique effects. Further, this model shows that stricter child labor policy, i.e. The child labor penalty increases the labor amelioration and decrease the child labor. The aggregate impact of change in child labor policy is sum of policy induced selection, scale and technique effects.

## APPENDIX B

### B.1 Imputations Methods

The nature of the missing data points, leads this study, towards three complementary approaches, as described by Pasteels (2013).

In the first case, time series has short gaps between existing data points (gaps are not more than three successive years). The missing periods are interpolated using a logarithmic growth function.

In the second case, an alternative (second best available) source of data for a given country is utilized for the missing periods.

$$\hat{a}_{(t+1)} = a_{(t)} * \frac{b_{(t+1)}}{b_{(t)}}$$

This information is employed to fill missing data points in the preferred time series (first best variable a), and the growth rate for second best source (variable b) is used. Note that this imputation approach is used for only ASEAN countries.